

On-shell operator construction in the effective field theory of gravity

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ABSTRACT: We construct the on-shell amplitude basis and the corresponding effective operators for generic modified gravity theory, such as pure gravity with higher derivatives, scalar-tensor gravity, Einstein-Yang-Mills, etc. Taking the Weyl tensor as the building block, we utilize the Young tensor technique to obtain independent operators, without equation of motion and total derivative redundancies. We update our algorithm and vastly increase the speed for finding the monomial basis (m-basis) of effective operators expressed in terms of Weyl tensors with Lorentz indices, the familiar form for the General Relativity community. Finally, we obtain the complete and independent amplitude and operator basis for GRSMEFT and GRLEFT up to mass dimension 10.

KEYWORDS: Effective Field Theories, Scattering Amplitudes

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1 Introduction

The modern era of gravitational theory was initiated by Einstein’s General Relativity (GR), which provided the geometric interpretation of the classical gravity. However, puzzles already existed when the quantum theory of physics was also discovered at around the same time, which pointed out that some compromise should be made for the gravitational theory to be compatible with a quantum theory of matter. The quantum field theory of gravity is expected to be non-renormalizable since the UV divergences arise at the loop order, requiring

an infinite number of higher curvature counterterms. From modern point of view [1–4], the non-renormalizability of the Einstein-Hilbert Lagrangian is understood to mean that the theory is an effective field theory (EFT), in which loops are made finite by counterterms provided by the higher curvature terms in the Lagrangian order-by-order. It suggests that the classical theory of gravity should be regarded as a low-energy effective theory of some UV completion, often referred to as quantum gravity. Although many impressive efforts have been made to construct such a UV completion based on the self-consistency requirement, no direct experiments can yet be conducted to test those theories since the typical scale is at the Planck mass M_{pl} , parametrically larger than the energy scale of current and near-future experiments. In this circumstance, the effective field theory of gravity [2–4] can be used to describe the quantum effects of gravity at low energies without knowing the complete theory.

At the same time, the accumulating data from gravitational observations, especially through the new probe of gravitational waves, are pushing our understanding of gravity beyond Einstein’s general relativity. Modified gravity [5, 6], which can derive from some specific theory of quantum gravity or just serve as a phenomenological model, is an active and diverse area of research in theoretical physics and cosmology, which aims to address various cosmological and gravitational puzzles, such as the accelerated expansion of the universe, the nature of dark matter and dark energy, and the behavior of gravity in extreme environments. From modern point of view, any modified gravity should be understood as effective field theory of gravity, which allows us to study gravity in a more tractable and model-independent way at low-energy region. The EFT approach in general starts from constructing a Lagrangian that includes all possible operators consistent with the symmetries of the theory and the power counting rules. In the case of gravity, the most important symmetry is the diffeomorphism, which asserts that the only degree of freedom for gravity should come from the Riemann curvature tensor of the spacetime manifold. By including higher-dimensional operators involving the Riemann curvature tensor, the gravity EFT captures the effects of higher-energy physics on the gravitational interactions in an organized and controlled manner. By matching the EFT predictions with experimental or observational data, we can constrain the values of the coefficients associated with the higher-dimensional operators. This can provide insights into the underlying fundamental theory of gravity or uncover new phenomena that could be observed in experiments.

The higher-dimensional operators are usually suppressed by the cutoff scale of the EFT Λ_{UV} . In the case of gravity EFT, it is typically taken to be the Planck scale M_{pl} , and thus the low energy effects of these higher dimensional operators are highly suppressed at energies much lower than the Planck scale. However, to address puzzles in the early universe the higher dimensional operators in modified gravity could play the important roles, such as Starobinsky theory [7] and $f(R)$ gravity, scalar-tensor gravity [8], Horava-Lifshitz gravity [9], etc. In the Higgs inflation [10], the Higgs boson could play the role of inflaton and thus the non-minimal coupling between the Higgs boson and Ricci scalar affects the Higgs potential significantly during inflation. Furthermore, there are also higher dimensional theories of gravity in which the cutoff scale Λ_{UV} is significantly lower than the Planck scale, such as the large extra dimensions [11], warped dimensions [12], DGP localized gravity [13], low scale string theory [14], etc. In these cases, higher dimensional operators between graviton field

and standard model fields is not so suppressed and thus their effects might be testified at future TeV colliders. To systematically investigate the sub-Planckian low energy effects, it is necessary to write down the gravity EFT operators. At the same time, the gravity scattering amplitude plays more and more important roles in the gravity EFT amplitude from double copy [15, 16], the positivity bounds of gravity EFTs [17–20], corrections on the gravitational potential and related effects [21, 22] and calculations on gravitational wave for testing the gravity EFTs [23, 24], etc. All of these call for the complete and independent amplitude and operator bases for gravity EFTs to serve as a key input for the future gravity EFT amplitude calculation. However, this task is highly non-trivial because of the redundancies of total derivative and field redefinition.

In recent years, techniques of on-shell scattering amplitudes have inspired a lot of new ideas in the area of effective field theory. In particular, it is found to be extremely convenient to treat effective operators as on-shell amplitudes [25–30], so that the equation of motion (EOM) redundancy is automatically removed and the integration-by-part (IBP) redundancy is translated to the requirement of momentum conservation. In this prescription, also known as the amplitude/operator correspondence, the operators yielding form factors that vanish on-shell should always be converted to a form with different constituting fields via field redefinition (usually equivalent to applying the classical equations of motion). In the case of gravity EFT, according to the on-shell prescription, we eliminate all the Ricci tensor $R_{\mu\nu}$ and Ricci scalar R in the Lagrangian by field redefinitions because they do not generate on-shell gravitons. One example is when the non-minimal gravitational coupling $Rf(\phi)$ is present in the so-called Jordan frame, one could go to the Einstein frame by a Weyl transformation where the non-minimal coupling is removed and the scalar potential is modified. From the on-shell perspective, the operators corresponding to on-shell amplitudes are written in the Einstein frame, thus no non-minimal couplings involving R should be present. In fact, the building block that does generate on-shell gravitons is the Weyl tensor $C_{\mu\nu\rho\sigma}$, and the gravitational non-minimal on-shell couplings [31], which can be written in terms of $C_{\mu\nu\rho\sigma}$, cannot be removed by field redefinitions and must be retained in the operator basis. We emphasize that the operator basis from on-shell method only describes local observables, hence the topological terms such as Gauss-Bonnet which are total derivative operators are not included in our basis.

Consequently, we generalize the amplitude/operator correspondence to involve the massless spin-2 particles, such that the operator bases can be obtained through constructing the corresponding amplitude bases, which are constructed using the Young tensor method [30] that has been applied to various EFTs [28, 32–34]. In the Young tensor method, the independent Lorentz structures of on-shell amplitudes are identified as the semi-standard Young tableaux of the primary Young diagram of the $SL(2, \mathbb{C}) \times SU(N)$ group [28, 35, 36], and the independent gauge structures are constructed by applying the modified Littlewood-Richardson rule at the Young tableau level. We also utilize the symmetric group to take account of the flavor structure of operators in a systematic way when the operators involve repeated fields [32, 37].

In this work, we consider all kinds of interactions in gravity EFTs, including pure gravity couplings with higher derivatives, gravity coupled to a scalar field and Goldstone

field, gravity coupled to a gauge field in Yang-Mills theory and gravity coupled to a fermion and apply the above method to obtain both the operator bases and the amplitude bases in these EFTs up to mass dimension 10. Furthermore, we consider two specific gravity EFTs: the standard model effective field theory (SMEFT) with graviton field extension, and the low energy effective field theory (LEFT) with graviton field extension, called GRSMEFT and GRLEFT, respectively. The GRSMEFT operators have been counted [38] using the Hilbert series method, and listed up to dimension 8 with one-flavor fermion using the traditional approach. In this work, we utilize the Young tensor method to list both the operator bases and the amplitude bases in the GRSMEFT and the GRLEFT up to mass dimension 10.

The paper is organized as follows. In section 2, firstly we introduce the tetrad formalism to define spinors in curved spacetime, so that the building blocks of gravity EFTs can be presented as spinors. Then we generalize the amplitude-operator correspondence to involve massless spin-2 fields and prove the validity of the generalization. At the end of the section, we use examples to show the conversions between operators presented by spinor indices and operators presented by Lorentz indices. In section 3, we list the operator bases and amplitude bases of pure gravity couplings and gravity coupled to a Goldstone scalar, a gauge boson, a fermion up to dimension 10. In section 4 and section 5, we list the operator bases and amplitude bases in the GRSMEFT and the GRLEFT up to dimension 10 respectively.

2 Gravity in Spinor-helicity formalism

2.1 Notation and building blocks

2.1.1 The tetrad (vielbein) formalism and spinors in curved spacetime

In curved spacetime, the tangent space at each point is a Minkowski space, so we can introduce a local Lorentz frame at each point x , with basis vectors $e_\mu(x)$ constituting a tetrad of the 4-dimensional spacetime, or vielbein in other dimensions. For a coordinate patch $\{x^{\mu'}\}$ of the spacetime manifold (μ' labels the spacetime coordinates), we have the local basis transformation $e_\mu(x) = e_{\mu'}^{\mu}(x) \frac{\partial}{\partial x^{\mu'}}$. Requiring the basis vectors to be orthonormal gives,

$$e_{\mu'}^{\mu}(x) e_{\nu'}^{\nu}(x) = g_{\mu'\nu'}(x), \quad (2.1)$$

or equivalently

$$e_{\mu'}^{\mu}(x) e^{\mu'\nu}(x) = \eta^{\mu\nu}, \quad (2.2)$$

where $g_{\mu'\nu'}$ is the metric tensor for the coordinate patch, and

$$\eta^{\mu\nu} = \eta_{\mu\nu} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix}. \quad (2.3)$$

The tetrad is related to the metric by

$$g_{\mu'\nu'} = e_{\mu'}^{\mu} e_{\nu'}^{\nu} \eta_{\mu\nu}. \quad (2.4)$$

Using e we can change indices from spacetime indices to tangent space indices or vice versa,

$$V^\mu = e_{\mu'}^\mu V^{\mu'}, \quad V^{\mu'} = e^{\mu'}_\mu V^\mu. \quad (2.5)$$

In order to define the spinors in a curved spacetime, first we introduce the Van der Waerden symbols (σ matrices) which give a mapping from spin space to Minkowski space as follows,

$$\begin{aligned} (\sigma^0)_{\alpha\dot{\alpha}} &= \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, & (\sigma^1)_{\alpha\dot{\alpha}} &= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \\ (\sigma^2)_{\alpha\dot{\alpha}} &= \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}, & (\sigma^3)_{\alpha\dot{\alpha}} &= \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}. \end{aligned} \quad (2.6)$$

The Van der Waerden symbols fulfill the following algebraic properties:

$$\sigma_{\alpha\dot{\alpha}}^\mu \sigma_{\mu\beta\dot{\beta}} = 2\epsilon_{\alpha\beta} \epsilon_{\dot{\alpha}\dot{\beta}}, \quad \text{Tr}[\sigma^\mu \bar{\sigma}^\nu] = \sigma_{\alpha\dot{\alpha}}^\mu \bar{\sigma}^{\nu\dot{\alpha}\alpha} = 2\eta^{\mu\nu}, \quad (2.7)$$

where

$$\epsilon_{\alpha\beta} = -\epsilon^{\alpha\beta} = \epsilon_{\dot{\alpha}\dot{\beta}} = -\epsilon^{\dot{\alpha}\dot{\beta}} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}, \quad \bar{\sigma} = (\sigma^0, -\vec{\sigma}), \quad (2.8)$$

so that $\epsilon_{\alpha\beta} \epsilon^{\beta\gamma} = \delta_\alpha^\gamma$. $\epsilon_{\alpha\beta}$, $\epsilon_{\dot{\alpha}\dot{\beta}}$ can be used to raise and lower spinor indices in the following way:

$$\epsilon_{\alpha\beta} \xi^\beta = \xi_\alpha, \quad \xi^\alpha = \epsilon^{\alpha\beta} \xi_\beta. \quad (2.9)$$

In curved spacetime, the Minkowski space is replaced by the tangent space at each point. We can choose a smooth orthonormal (restricted) tetrad $e_{\mu'}^\mu(x)$ and define the σ 's in the local frame of the tangent space as eq. (2.6). Since the components of a tensor in the local frame and the spacetime frame are connected by eq. (2.5), we can define the mapping from the tensors in spacetime frame to spinors in the local frame as

$$\sigma_{\alpha\dot{\alpha}}^{\mu'}(x) = e^{\mu'}_\mu(x) \sigma_{\alpha\dot{\alpha}}^\mu, \quad (2.10)$$

fulfilling

$$\sigma_{\alpha\dot{\alpha}}^{\mu'} \sigma_{\mu'\beta\dot{\beta}} = 2\epsilon_{\alpha\beta} \epsilon_{\dot{\alpha}\dot{\beta}}, \quad \sigma_{\alpha\dot{\alpha}}^{\mu'} \sigma^{\nu'\alpha\dot{\alpha}} = 2g^{\mu'\nu'}. \quad (2.11)$$

For example, the gauge field in the chiral basis $F_{L/R} = \frac{1}{2}(F \pm i\tilde{F})$ can be presented as

$$\begin{aligned} F_{L\alpha\beta} &= \frac{i}{2} F_{L\mu'\nu'} \sigma_{\alpha\beta}^{\mu'\nu'} = \frac{i}{2} F_{L\mu'\nu'} e^{\mu'}_\mu e^{\nu'}_\nu \sigma_{\alpha\beta}^{\mu\nu} = \frac{i}{2} F_{L\mu\nu} \sigma_{\alpha\beta}^{\mu\nu}, \\ F_{R\dot{\alpha}\dot{\beta}} &= -\frac{i}{2} F_{R\mu'\nu'} \bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu'\nu'} = -\frac{i}{2} F_{R\mu'\nu'} e^{\mu'}_\mu e^{\nu'}_\nu \bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu} = -\frac{i}{2} F_{R\mu\nu} \bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu}, \end{aligned} \quad (2.12)$$

where

$$\sigma_{\alpha\beta}^{\mu\nu} = \frac{i}{2} (\sigma^\mu \bar{\sigma}^\nu - \sigma^\nu \bar{\sigma}^\mu)_{\alpha\beta}, \quad (2.13)$$

$$\bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu} = \frac{i}{2} (\bar{\sigma}^\mu \sigma^\nu - \bar{\sigma}^\nu \sigma^\mu)_{\dot{\alpha}\dot{\beta}}. \quad (2.14)$$

The covariant derivative satisfies¹

$$D_{\lambda'} g_{\mu'\nu'} = 0, \quad D_{\mu'} e_{\nu'}{}^\mu = 0, \quad (2.15)$$

and corrects local Lorentz and spinor indices with the spin connection $\omega_{\mu'}{}^{\mu\nu}$, where

$$\omega_{\mu'}{}^{\mu\nu} = e_{\nu'}{}^\mu \partial_{\mu'} e^{\nu'\nu} + e_{\nu'}{}^\mu \Gamma_{\mu'\lambda'}^{\nu'} e^{\lambda'\nu}, \quad (2.16)$$

$$\Gamma_{\mu'\nu'}^{\lambda'} = \frac{1}{2} g^{\lambda'\sigma'} (\partial_{\mu'} g_{\nu'\sigma'} + \partial_{\nu'} g_{\sigma'\mu'} - \partial_{\sigma'} g_{\mu'\nu'}). \quad (2.17)$$

In general cases, the covariant derivative acting on a field f takes the form

$$D_{\mu'} f^x = \left(\delta^x_y \partial_{\mu'} - \frac{i}{2} \omega_{\mu'}{}^{\mu\nu} (X_{[\mu\nu]})^x_y \right) f^y. \quad (2.18)$$

For example, for the spinor representation $X_{[\mu\nu]} = -\frac{\sigma_{\mu\nu}}{2}$, while for the vector representation $(X_{[\mu\nu]})^\rho{}_\kappa = i(\delta_\mu{}^\rho \eta_{\nu\kappa} - \delta_\nu{}^\rho \eta_{\mu\kappa})$. The components of the covariant derivative in the tangent space are just

$$D_\mu = e^{\mu'}{}_\mu D_{\mu'}, \quad D_{\alpha\dot{\alpha}} = D_\mu \sigma^\mu_{\alpha\dot{\alpha}}, \quad (2.19)$$

and satisfies

$$[D_\mu, D_\nu] = -i X_{[\rho\kappa]} R_{\mu\nu}{}^{\rho\kappa}, \quad (2.20)$$

where $R_{\mu\nu}{}^{\rho\kappa}$ is the Riemann tensor in the tangent space and the gauge structure of the covariant derivative is not considered. In the following content, all operators and relations are written down in a local frame of the tangent space.

2.1.2 Building blocks of gravity EFTs

In general relativity, the Riemann tensor $R_{\mu\nu\rho\sigma}$ can be decomposed into irreducible representations of the Lorentz group as

$$R_{\mu\nu\rho\sigma} \sim (1, 1) \oplus (2, 0) \oplus (0, 2) \oplus (0, 0). \quad (2.21)$$

The $(1, 1)$ and the $(0, 0)$ representations can be recognized as the traceless part of Ricci tensor $R_{\mu\nu}$ and the Ricci scalar R respectively, and the component transforming as $(2, 0) \oplus (0, 2)$ is the Weyl tensor $C_{\mu\nu\rho\sigma}$.

$$C_{\mu\nu\rho\sigma} \equiv R_{\mu\nu\rho\sigma} - (\eta_{\mu[\rho} R_{\sigma]\nu} - \eta_{\nu[\rho} R_{\sigma]\mu}) + \frac{1}{3} \eta_{\mu[\rho} \eta_{\sigma]\nu} R. \quad (2.22)$$

In gravity EFTs, any effective operator involving $R_{\mu\nu}$ or R can be eliminated by a field redefinition of the metric [38], which is equivalent to substituting the EOM of GR, that is, the Einstein's equations, at the leading order of the field redefinition. For example, consider the following effective action

$$S_{\text{eff}} = \int d^4x \sqrt{-g} \left[-\frac{M_{\text{pl}}^2}{2} R + \mathcal{L}_{\text{matter}} + aR^2 + bR_{\mu\nu}R^{\mu\nu} + c\phi^2 R + \dots \right], \quad (2.23)$$

¹We emphasize that the covariant derivative D is different from the connection ∇ since D counts the Lorentz and gauge structure of a tensor in the tangent space while ∇ does not. For example, $D_{\mu'} e_{\nu'}{}^\mu = \partial_{\mu'} e_{\nu'}{}^\mu - \Gamma_{\mu'\nu'}^{\lambda'} e_{\lambda'}{}^\mu + \omega_{\mu'}{}^\mu{}_\nu e_{\nu'}{}^\nu$ while $\nabla_{\mu'} e_{\nu'}{}^\mu = \partial_{\mu'} e_{\nu'}{}^\mu - \Gamma_{\mu'\nu'}^{\lambda'} e_{\lambda'}{}^\mu$.

where ϕ is a scalar field and the term $c\phi^2 R$ is a non-minimal coupling of gravity and the scalar field. After a field redefinition of the metric

$$g_{\mu\nu} \rightarrow g_{\mu\nu} - \frac{2}{M_{\text{pl}}^2} \Delta g_{\mu\nu}, \quad \Delta g_{\mu\nu} = \left(a + \frac{b}{2}\right) R g_{\mu\nu} - b R_{\mu\nu} + c\phi^2 g_{\mu\nu}, \quad (2.24)$$

the effective action eq. (2.23) becomes

$$S_{\text{eff}} \rightarrow \int d^4x \sqrt{-g} \left[-\frac{M_{\text{pl}}^2}{2} R + \mathcal{L}_{\text{matter}} - \frac{1}{M_{\text{pl}}^2} \left(a + \frac{b}{2}\right) T R + \frac{b}{M_{\text{pl}}^2} T^{\mu\nu} R_{\mu\nu} - \frac{c}{M_{\text{pl}}^2} T \phi^2 + \mathcal{O}\left(\frac{1}{M_{\text{pl}}^4}\right) + \dots \right], \quad (2.25)$$

where $T^{\mu\nu} \equiv \frac{2}{\sqrt{-g}} \frac{\delta(\sqrt{-g} \mathcal{L}_{\text{matter}})}{\delta g_{\mu\nu}}$ and $T \equiv T^{\mu\nu} g_{\mu\nu}$. Comparing eq. (2.25) with eq. (2.23), one can explicitly see that the dimension-4 effective operators involving $R_{\mu\nu}$ or R in eq. (2.23) disappear while higher-dimensional operators emerge in eq. (2.25), and the order $\mathcal{O}\left(\frac{1}{M_{\text{pl}}^2}\right)$ terms in eq. (2.25) can be obtained by substituting the following trace-reversed Einstein's equations into the dimension-4 effective operators once in eq. (2.23),

$$R_{\mu\nu} = \frac{1}{M_{\text{pl}}^2} \left(T_{\mu\nu} - \frac{1}{2} T g_{\mu\nu}\right). \quad (2.26)$$

Similarly, other field redefinitions of metric can be performed to further eliminate the operators involving $R_{\mu\nu}$ or R in eq. (2.25) until all of them are eliminated. It should be noted that the field redefinition $\Delta g_{\mu\nu} \propto \phi^2 g_{\mu\nu}$ is a Weyl transformation that remove the non-minimal coupling $c\phi^2 R$, so the effective action eq. (2.25) is in the Einstein frame, and so are the effective operators in the following content.

Since the Weyl tensor and the Riemann tensor only differ by terms that involve $R_{\mu\nu}$ or R , we can use the Weyl tensor $C_{\mu\nu\rho\sigma}$ instead of the Riemann tensor $R_{\mu\nu\rho\sigma}$ to construct EFT operators. The following contracted Bianchi identities,

$$D^\mu R_{\mu\nu\rho\sigma} = 2D_{[\rho} R_{\sigma]\nu}, \quad D^\mu R_{\mu\nu} = \frac{1}{2} D_\nu R, \quad (2.27)$$

imply the EOM of the Weyl tensor

$$D^\mu C_{\mu\nu\rho\sigma} = D_{[\rho} R_{\sigma]\nu} + \frac{1}{6} \eta_{\nu[\rho} D_{\sigma]} R, \quad (2.28)$$

where the terms on the right-hand side only involve the Ricci tensor $R_{\mu\nu}$ and Ricci scalar R , and thus can be replaced via the EOM. Furthermore, the Bianchi identity

$$D_\kappa R_{\mu\nu\rho\sigma} + D_\rho R_{\mu\nu\sigma\kappa} + D_\sigma R_{\mu\nu\kappa\rho} = 0 \quad (2.29)$$

implies that similar relation holds for the Weyl tensor

$$D_\kappa C_{\mu\nu\rho\sigma} + D_\rho C_{\mu\nu\sigma\kappa} + D_\sigma C_{\mu\nu\kappa\rho} = 0 \quad (2.30)$$

up to terms that can be removed by the EOM. Eq. (2.30), together with the EOM of the Weyl tensor eq. (2.28), implies that $D^2 C_{\mu\nu\rho\sigma}$ is redundant as well. Similarly for $\tilde{C}^{\mu\nu\rho\sigma} = \frac{1}{2}\epsilon^{\mu\nu\lambda\xi}C_{\lambda\xi}{}^{\rho\sigma}$, one can straightforwardly find that $D^\mu \tilde{C}_{\mu\nu\rho\sigma}$ and $D^2 \tilde{C}_{\mu\nu\rho\sigma}$ are redundant from eq. (2.30).

In analogy to the gauge field, the Weyl tensor $C_{\mu\nu\rho\sigma}$ can be decomposed into its irreducible parts of the Lorentz group,

$$C_{L/R\mu\nu\rho\sigma} = \frac{1}{2} \left(C_{\mu\nu\rho\sigma} \mp i \tilde{C}_{\mu\nu\rho\sigma} \right), \quad (2.31)$$

where $\tilde{C}^{\mu\nu\rho\sigma} = \frac{1}{2}\epsilon^{\mu\nu\lambda\xi}C_{\lambda\xi}{}^{\rho\sigma}$, $\epsilon^{0123} = 1$. Furthermore, the left-handed and right-handed Weyl tensors can be defined in the local spinor space through the Van der Waerden symbols introduced in eq. (2.6),

$$C_{L\alpha\beta\gamma\delta} = -\frac{1}{4}C_{L\mu\nu\rho\lambda}\sigma_{\alpha\beta}^{\mu\nu}\sigma_{\gamma\delta}^{\rho\lambda}, \quad C_{R\dot{\alpha}\dot{\beta}\dot{\gamma}\dot{\delta}} = -\frac{1}{4}C_{R\mu\nu\rho\lambda}\bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu}\bar{\sigma}_{\dot{\gamma}\dot{\delta}}^{\rho\lambda}. \quad (2.32)$$

It is straightforward to verify that all the spinor indices in C_L and C_R are totally symmetric.

To conclude, the Lorentz structure of the building blocks in general gravity EFTs are presented as fields and covariant derivatives denoted by the irreducible representations under the Lorentz group $SL(2, \mathbb{C}) = SU(2)_l \times SU(2)_r$ in the tangent space, that is,

$$\begin{aligned} \phi &\in (0, 0), & \psi_\alpha &\in (1/2, 0), & \psi_\alpha^\dagger &\in (0, 1/2), \\ F_{L\alpha\beta} &= \frac{i}{2}F_{\mu\nu}\sigma_{\alpha\beta}^{\mu\nu} \in (1, 0), & F_{R\dot{\alpha}\dot{\beta}} &= -\frac{i}{2}F_{\mu\nu}\bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu} \in (0, 1), \\ C_{L\alpha\beta\gamma\delta} &= -\frac{1}{4}C_{\mu\nu\rho\lambda}\sigma_{\alpha\beta}^{\mu\nu}\sigma_{\gamma\delta}^{\rho\lambda} \in (2, 0), & C_{R\dot{\alpha}\dot{\beta}\dot{\gamma}\dot{\delta}} &= -\frac{1}{4}C_{\mu\nu\rho\lambda}\bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu}\bar{\sigma}_{\dot{\gamma}\dot{\delta}}^{\rho\lambda} \in (0, 2), \\ D_{\alpha\dot{\alpha}} &= D_\mu\sigma_{\alpha\dot{\alpha}}^\mu \in (1/2, 1/2). \end{aligned} \quad (2.33)$$

2.2 Amplitude-operator correspondence and Young tableau method

The amplitude-operator correspondence for massless fields with helicity $|h| \leq 1$ was introduced in ref. [32] and generalized to cases involving massive scalars and fermions in ref. [33]. In order to apply the correspondence to general gravity EFTs, it should be further generalized to involve fields with helicity $|h| = 2$. Intuitively, the generalized correspondence can be presented as follows,

$$\begin{aligned} D^{r_i-2}C_{L/Ri} &\Leftrightarrow \lambda_i^{r_i\pm 2}\tilde{\lambda}_i^{r_i\mp 2}, \\ D^{r_i-1}F_{L/Ri} &\Leftrightarrow \lambda_i^{r_i\pm 1}\tilde{\lambda}_i^{r_i\mp 1}, \\ D^{r_i-1/2}\psi_i^{(\dagger)} &\Leftrightarrow \lambda_i^{r_i\pm 1/2}\tilde{\lambda}_i^{r_i\mp 1/2}, \\ D^{r_i}\phi_i &\Leftrightarrow \lambda_i^{r_i}\tilde{\lambda}_i^{r_i}, \end{aligned} \quad (2.34)$$

where i labels the i th field in an operator, $i \in \{1, 2, \dots, N\}$, and N denotes the number of fields in the operator. r_i is a positive integer or half-integer depending on whether the field is bosonic or fermionic. However, as we illustrated for $|h| \leq 1$ fields in ref. [32], the correspondence for $C_{L/Ri}$ is exact if and only if all left(right)-handed spinor indices in the building block $D^{r_i-2}C_{L/Ri}$ are totally symmetric.

To prove that, let us consider all the left-handed spinor indices in $D^{r_i-2}C_{Li}$. The symmetry of the right-handed spinor indices in $D^{r_i-2}C_{Li}$ and the symmetry of the spinor in $D^{r_i-2}C_{Ri}$ can be proved similarly. Firstly it should be noted that the spinor indices of C_{Li} are totally symmetric since $C_L \in (2, 0)$. Secondly, if two left-handed spinor indices of the covariant derivatives in $D^{r_i-2}C_{Li}$ are antisymmetric, then

$$D_{[\alpha\dot{\alpha}}D_{\beta]\dot{\beta}} = D_\mu D_\nu \sigma_{[\alpha\dot{\alpha}}^\mu \sigma_{\beta]\dot{\beta}}^\nu = -D^2 \epsilon_{\alpha\beta} \epsilon_{\dot{\alpha}\dot{\beta}} + \frac{i}{2} [D_\mu, D_\nu] \epsilon_{\alpha\beta} \bar{\sigma}_{\dot{\alpha}\dot{\beta}}^{\mu\nu}. \quad (2.35)$$

The first term on the right side in eq. (2.35) acting on C_L gives $D^2 C_L$, and the second term is just the covariant derivative commutator eq. (2.20), which after the replacement will transform the operator to other type, so the left side in eq. (2.35) can be equivalently set to zero if one enumerates operators type by type. Thirdly, if one left-handed spinor index of the covariant derivative and one left-handed spinor index of the C_L are antisymmetric, then

$$\begin{aligned} D_{[\alpha\dot{\alpha}} C_{L\beta]\gamma\delta\epsilon} &= -\frac{1}{4} D_\mu C_{\nu\rho\sigma\lambda} \sigma_{[\alpha\dot{\alpha}}^\mu \sigma_{\beta]\gamma}^{\nu\rho} \sigma_{\delta\epsilon}^{\sigma\lambda} \\ &= \frac{i}{8} \epsilon_{\alpha\beta} D_\mu C_{\nu\rho\sigma\lambda} [2\eta^{\rho\mu} (\sigma^\nu)_{\gamma\dot{\alpha}} + i\epsilon^{\nu\rho\mu\kappa} (\sigma_\kappa)_{\gamma\dot{\alpha}}] (\sigma^{\sigma\lambda})_{\delta\epsilon} \\ &= -\frac{i}{4} \epsilon_{\alpha\beta} (\sigma^\nu)_{\gamma\dot{\alpha}} (\sigma^{\sigma\lambda})_{\delta\epsilon} D^\mu C_{\mu\nu\sigma\lambda}, \end{aligned} \quad (2.36)$$

which is the EOM of the Weyl tensor and thus can also be set to zero.

To conclude, only the totally symmetric part of $D^{r_i-2}C_{L/Ri}$ needs to be considered in operator construction perspective, so the amplitude-operator correspondence can be naturally generalized for $|h| = 2$ fields as in eq. (2.34). With such an amplitude-operator correspondence, a set of non-redundant operators can be constructed by finding an on-shell amplitude basis utilizing the Young tableau method introduced in ref. [28].

Here we briefly introduce the Young tableau method to obtain on-shell amplitudes basis. The on-shell amplitudes of N particles involving $2n$ λ s and $2\tilde{n}$ $\tilde{\lambda}$ s span a irreducible representation of $SU(N)$ group denoted by the following primary Young diagram,

$$Y_{N,n,\tilde{n}} = \underbrace{\left\{ \begin{array}{c} \begin{array}{ccccc} \boxed{} & \cdots & \boxed{} & \boxed{} & \cdots & \boxed{} \\ \boxed{} & \cdots & \boxed{} & \boxed{} & \cdots & \boxed{} \end{array} \\ \vdots \\ \begin{array}{ccccc} \boxed{} & \cdots & \boxed{} & \boxed{} & \cdots & \boxed{} \\ \boxed{} & \cdots & \boxed{} & \boxed{} & \cdots & \boxed{} \end{array} \end{array} \right\}}_{\tilde{n}} \quad (2.37)$$

The independent on-shell amplitudes can be recognized as the basis vectors of the irreducible representation, and the basis vectors are given by semi-standard Young tableaux (SSYTs) of the Young diagram. Here the amplitudes being independent means that the redundancies of total momentum conservation and the Schouten identity are removed, and the independence is guaranteed by the Fock's condition of Young tableaux. The SSYTs can be obtained from filling the Young diagram with numbers $i \in \{1, \dots, N\}$, and the multiplicity of the number i , $\#i = \tilde{n} - 2h_i$, where h_i denotes the helicity of the i th particle, and the label i of the corresponding particle are determined by setting the helicity sequence $\{h_i\}$ in an ascending order. The SSYTs can be translated to amplitudes column by column using the following

rules

$$\langle ij \rangle \sim \boxed{\begin{smallmatrix} i \\ j \end{smallmatrix}}, \quad \mathcal{E}^{k_1 \dots k_{N-2} ij} [ij] \sim \left. \begin{array}{c} \boxed{k_1} \\ \boxed{k_2} \\ \vdots \\ \boxed{k_{N-2}} \end{array} \right\} \begin{array}{c} N-2 \\ 2 \end{array}, \quad (2.38)$$

where $\mathcal{E}$ is the Levi-Civita tensor of the $SU(N)$ group.

The gauge structures of on-shell amplitudes are the Levi-Civita tensors contracted with fundamental representation indices of fields if all the fields are expressed with fundamental representation indices only. In fact, a field as a irreducible representation of the gauge group can always be presented in a form with fundamental representations indices with certain permutation symmetries. Here we lists some simple examples to show that field of non-fundamental representaion can be expressed in terms of tensor with fundamental indices only, which also correspond to Young tableaux denoting the permutation symmetries of their indices,

$$\begin{aligned} \epsilon_{acd} \lambda_b^{Ad} G^A &= G_{abc} \sim \boxed{\begin{array}{cc} a & b \\ c & \end{array}}, \\ \epsilon_{abc} Q^{\dagger, c} &= Q_{ab}^{\dagger} \sim \boxed{\begin{array}{c} a \\ b \end{array}}, \\ \epsilon_{jk} \tau_i^k W^I &= W_{ij} \sim \boxed{i} \boxed{j}, \\ \epsilon_{ij} H^{\dagger, j} &= H_i \sim \boxed{i}. \end{aligned} \quad (2.39)$$

The independent gauge basis are obtained through constructing singlet representations Young tableaux from the gauge Young tableaux of all fields for each gauge group using the modified Littlewood-Richardson rule [28]. The direct product of the gauge basis and the Lorentz basis gives the y-basis of on-shell amplitudes.

2.3 Conversion

In ref. [28], in order to get monomial operators, we started from the amplitude y-basis, which is directly translated to a basis of monomial operators with spinor indexed building blocks such as $D_{\alpha\dot{\alpha}}$ and $F_{L\alpha\beta}$, and convert them into the form with Lorentz indexed building blocks D_{μ} and $F_{L\mu\nu}$. Nevertheless, it is usually not efficient, especially when the conversion between the two forms are time consuming, or when there are way more monomials than necessary. In the gravity EFT, the conversion inevitably involves a very long chain of σ or γ matrices, which is indeed time consuming. In ref. [39], the chiral perturbation theory was studied where the monomial basis (m-basis) is obtained in a reversed process, which we adopt here. We directly construct a set of Lorentz invariant operators $\{\mathcal{O}'_i\}$ by traversing different contractions of the Lorentz indices, which form an over-complete m-basis. It is a lot easier to dressing all the Lorentz indices in operators with σ and extract the on-shell amplitudes they generate. Afterwards, with the reduction rules introduced in ref. [28], one can reduce the amplitudes onto the y-basis, and then independent operators among

$\{\mathcal{O}'_i\}$ can be selected by requiring their coordinates under the y-basis to be numerically independent vectors. We'll see two examples to illustrate the process.

The first example is the type $D^2LL^\dagger QQ^\dagger$, it is straightforward to write down the following over-complete operators based on the properties of γ matrices,

$$\begin{array}{c|c}
 D^2LL^\dagger QQ^\dagger & \\
 \hline
 \mathcal{O}'_1 & (D_\mu L_{pi} D^\mu Q_{raj})(L_s^{\dagger i} Q_t^{\dagger aj}) \\
 \mathcal{O}'_2 & (D_\mu L_{pi} D^\mu Q_{raj})(L_s^{\dagger j} Q_t^{\dagger ai}) \\
 \mathcal{O}'_3 & (D_\mu L_{pi} Q_{raj})(D^\mu L_s^{\dagger i} Q_t^{\dagger aj}) \\
 \mathcal{O}'_4 & (D_\mu L_{pi} Q_{raj})(D^\mu L_s^{\dagger j} Q_t^{\dagger ai}) \\
 \mathcal{O}'_5 & (D_\mu L_{pi} D_\nu Q_{raj})(L_s^{\dagger i} \bar{\sigma}^{\mu\nu} Q_t^{\dagger aj}) \\
 \mathcal{O}'_6 & (D_\mu L_{pi} D_\nu Q_{raj})(L_s^{\dagger j} \bar{\sigma}^{\mu\nu} Q_t^{\dagger ai}) \\
 \mathcal{O}'_7 & (D^\nu L_{pi} \sigma_\mu L_s^{\dagger i})(D^\mu Q_{raj} \sigma_\nu Q_t^{\dagger aj}) \\
 \mathcal{O}'_8 & (D^\nu L_{pi} \sigma_\mu Q_t^{\dagger aj})(D^\mu Q_{raj} \sigma_\nu L_s^{\dagger i}) \\
 \mathcal{O}'_9 & (D^\mu L_{pi} \sigma_\mu L_s^{\dagger i})(D^\nu Q_{raj} \sigma_\nu Q_t^{\dagger aj}).
 \end{array} \tag{2.40}$$

The on-shell amplitudes generated by the operators in eq. (2.40) can be expanded on the amplitude y-basis:

$$\begin{array}{c|c}
 \text{Y-basis} & \mathcal{A}(L_i(1), Q_{aj}(2), L^{\dagger k}(3), Q^{\dagger bl}(4)) \\
 \hline
 \mathcal{A}_1^{(y)} & \delta_k^i \delta_l^j \delta_b^a \langle 12 \rangle \langle 34 \rangle [34]^2 \\
 \mathcal{A}_2^{(y)} & \delta_k^i \delta_l^j \delta_b^a \langle 13 \rangle \langle 24 \rangle [34]^2 \\
 \mathcal{A}_3^{(y)} & \delta_l^i \delta_k^j \delta_b^a \langle 12 \rangle \langle 34 \rangle [34]^2 \\
 \mathcal{A}_4^{(y)} & \delta_l^i \delta_k^j \delta_b^a \langle 13 \rangle \langle 24 \rangle [34]^2
 \end{array} \tag{2.41}$$

and the coefficient matrix is obtained as

$$\begin{pmatrix}
 \frac{1}{2} & 0 & 0 & 0 \\
 0 & 0 & \frac{1}{2} & 0 \\
 0 & -\frac{1}{2} & 0 & 0 \\
 0 & 0 & 0 & -\frac{1}{2} \\
 -\frac{i}{2} & i & 0 & 0 \\
 0 & 0 & -\frac{i}{2} & i \\
 -1 & 1 & 0 & 0 \\
 0 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0
 \end{pmatrix}, \tag{2.42}$$

where the coefficients in the last row being all 0 is the consequence of $\mathcal{O}'_9$ corresponding to the EOM redundancy. From eq. (2.42) one can choose 4 independent rows of the matrix as a complete basis of $D^2LL^\dagger QQ^\dagger$, for example, the 4 rows which are marked red in eq. (2.42). We can also give priority to $\mathcal{O}'_7, \mathcal{O}'_8$ if necessary. We don't even need to list all the alternative operators $\mathcal{O}'_i$ at the beginning. Our package checks the independence of each candidate during the construction until obtaining the complete base. The method avoids dealing with a long chain of σ matrices and is especially time saving for types including gravitons as will be demonstrated in the next example. The second example is type C_L^5 . To focus

on the independence of the Lorentz structure, it is straightforward to write down the following contractions.

C_L^5	
$\mathcal{O}'_1$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3}^{\mu\nu\eta\xi}C_{L4\tau\nu\phi\chi}C_{L5}^{\tau\nu\phi\chi}$
$\mathcal{O}'_2$	$C_{L1\mu\nu\lambda\rho}C_{L2}^{\mu\nu\lambda\rho}C_{L3\eta\xi\tau\nu}C_{L4\phi\chi}^{\tau\nu}C_{L5}^{\eta\xi\phi\chi}$
$\mathcal{O}'_3$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3\tau\nu}^{\eta\xi}C_{L4\phi\chi}^{\mu\nu}C_{L5}^{\phi\chi\tau\nu}$
$\mathcal{O}'_4$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3}^{\mu\nu\lambda\rho}C_{L4\phi\chi}^{\tau\nu}C_{L5}^{\phi\chi\eta\xi}$
$\mathcal{O}'_5$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3}^{\tau\nu\lambda\rho}C_{L4\phi\chi}^{\mu\nu}C_{L5}^{\phi\chi\eta\xi}$
$\mathcal{O}'_6$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3\tau\nu}^{\eta\xi}C_{L4\phi\chi}^{\tau\nu}C_{L5}^{\phi\chi\mu\nu}$
$\mathcal{O}'_7$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3}^{\tau\nu\lambda\rho}C_{L4\phi\chi}^{\eta\xi}C_{L5}^{\phi\chi\mu\nu}$
$\mathcal{O}'_8$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3}^{\eta\xi\tau\nu}C_{L4\phi\chi}^{\lambda\rho}C_{L5}^{\phi\chi\mu\nu}$
$\mathcal{O}'_9$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3\tau\nu\phi\chi}C_{L4}^{\mu\nu\eta\xi}C_{L5}^{\tau\nu\phi\chi}$
$\mathcal{O}'_{10}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3\tau\nu\phi\chi}C_{L4}^{\mu\nu\phi\chi}C_{L5}^{\tau\nu\eta\xi}$
$\mathcal{O}'_{11}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\lambda\rho}C_{L4}^{\mu\nu\tau\nu}C_{L5}^{\phi\chi\eta\xi}$
$\mathcal{O}'_{12}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\tau\nu}C_{L4}^{\mu\nu\lambda\rho}C_{L5}^{\phi\chi\eta\xi}$
$\mathcal{O}'_{13}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi}^{\lambda\rho}C_{L3\phi\chi\tau\nu}C_{L4}^{\phi\chi\eta\xi}C_{L5}^{\tau\nu\mu\nu}$
$\mathcal{O}'_{14}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\lambda\rho}C_{L4}^{\eta\xi\tau\nu}C_{L5}^{\phi\chi\mu\nu}$
$\mathcal{O}'_{15}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\tau\nu}C_{L4}^{\eta\xi\lambda\rho}C_{L5}^{\phi\chi\mu\nu}$
$\mathcal{O}'_{16}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\lambda\rho}C_{L4}^{\mu\nu\phi\chi}C_{L5}^{\eta\xi\tau\nu}$
$\mathcal{O}'_{17}$	$C_{L1\mu\nu\lambda\rho}C_{L2\eta\xi\tau\nu}C_{L3\phi\chi}^{\tau\nu}C_{L4}^{\eta\xi\phi\chi}C_{L5}^{\mu\nu\lambda\rho}$
$\mathcal{O}'_{18}$	$C_{L1\eta\xi\tau\nu}C_{L2\phi\chi}^{\tau\nu}C_{L3\mu\nu\lambda\rho}C_{L4}^{\mu\nu\lambda\rho}C_{L5}^{\eta\xi\phi\chi}$
$\vdots$	$\vdots$

(2.43)

Again, each operator in eq. (2.43) can be expanded on the amplitude y-basis

Y-basis	$\mathcal{A}(C_{L1}, C_{L2}, C_{L3}, C_{L4}, C_{L5})$
$\mathcal{A}_1^{(y)}$	$\langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2$
$\mathcal{A}_2^{(y)}$	$\langle 13 \rangle^4 \langle 24 \rangle^2 \langle 25 \rangle^2 \langle 45 \rangle^2$
$\mathcal{A}_3^{(y)}$	$\langle 13 \rangle^3 \langle 14 \rangle \langle 24 \rangle^2 \langle 25 \rangle^2 \langle 35 \rangle \langle 45 \rangle$
$\mathcal{A}_4^{(y)}$	$\langle 13 \rangle^2 \langle 14 \rangle^2 \langle 24 \rangle^2 \langle 25 \rangle^2 \langle 35 \rangle^2$
$\mathcal{A}_5^{(y)}$	$\langle 12 \rangle^3 \langle 14 \rangle \langle 24 \rangle \langle 34 \rangle \langle 35 \rangle^3 \langle 45 \rangle$
$\mathcal{A}_6^{(y)}$	$\langle 12 \rangle^3 \langle 13 \rangle \langle 24 \rangle \langle 34 \rangle \langle 35 \rangle^2 \langle 45 \rangle^2$
$\mathcal{A}_7^{(y)}$	$\langle 12 \rangle^3 \langle 13 \rangle \langle 23 \rangle \langle 34 \rangle \langle 35 \rangle \langle 45 \rangle^3$
$\mathcal{A}_8^{(y)}$	$\langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle \langle 24 \rangle \langle 25 \rangle \langle 45 \rangle^3$
$\mathcal{A}_9^{(y)}$	$\langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle^2 \langle 25 \rangle \langle 35 \rangle \langle 45 \rangle^2$
$\mathcal{A}_{10}^{(y)}$	$\langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 24 \rangle^2 \langle 25 \rangle \langle 35 \rangle^3$
$\mathcal{A}_{11}^{(y)}$	$\langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle^2 \langle 25 \rangle \langle 35 \rangle^2 \langle 45 \rangle$
$\mathcal{A}_{12}^{(y)}$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^4$
$\mathcal{A}_{13}^{(y)}$	$\langle 12 \rangle^2 \langle 14 \rangle^2 \langle 24 \rangle^2 \langle 35 \rangle^4$
$\mathcal{A}_{14}^{(y)}$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \langle 35 \rangle \langle 45 \rangle^3$
$\mathcal{A}_{15}^{(y)}$	$\langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 24 \rangle^2 \langle 35 \rangle^3 \langle 45 \rangle$
$\mathcal{A}_{15}^{(y)}$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2$

(2.44)

The coefficient matrix is obtained as

$$\frac{1}{32} \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 2 & -2 & 0 & 0 & 1 & 0 & -2 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & -2 & 2 & 0 & 0 & 0 & 1 & 0 & -2 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 0 & 0 & -4 & 2 & 2 & -4 & 0 & 0 & 1 & 0 & -6 & 0 & 6 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 2 & -2 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -2 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 2 & -4 & 0 & 0 & 0 & -2 & 2 & 0 & 1 & 0 & -4 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -2 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & -2 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & -2 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & -2 & 1 & 0 & 0 & 0 & 2 & -4 & 0 & 2 & 1 & 0 & -4 & 0 & 3 \\ 0 & 1 & -2 & 1 & 0 & 0 & 0 & 0 & -2 & -2 & 4 & 0 & 1 & 0 & -2 & 1 \\ 1 & 0 & 0 & 0 & 2 & -6 & 2 & 0 & 0 & 0 & 0 & 1 & 1 & -4 & -4 & 6 \\ \dots & & & & & & & & & & & & & & \end{pmatrix}. \quad (2.45)$$

From eq. (2.45) one can choose 16 independent rows of the matrix as a complete Lorentz basis of C_L^5 , for example, the 16 rows which are marked red in eq. (2.45). Although the list of Lorentz invariant operators in eq. (2.43) goes on beyond the 18 explicitly written ones, we may stop here because we have already found 16 independent structures, and any other structures can be expressed as linear combinations of the basis just by solving the linear equation of the coordinates.

Note that the 16 operators are independent under the assumption that the five Weyl tensors are distinguishable by an extra label $\{1, 2, 3, 4, 5\}$ as in eq. (2.43). In gravity EFTs, all the Weyl tensors are indistinguishable, and we should consider the totally symmetric amplitudes that satisfy the Bose symmetry of the gravitons. This is done by directly symmetrizing the monomial y-basis amplitude with the corresponding particle labels. After symmetrization, the resulting amplitudes can still be projected onto the y-basis and obtained the corresponding coordinates forming the coefficient matrix similar to eq. (2.45), from which one can select the independent components and record the y-basis amplitudes they symmetrize from as the so-called f-basis as introduced in ref. [30]. These monomial f-basis amplitudes after the selection are reported as the amplitude basis in the remaining sections of our paper. Specifically, for the aforementioned C_L^5 , all the amplitude are symmetrized to a single form $\langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2 + \text{symm}(12345)$ resulting only one f-basis. Such a technique can also be used to find the f-basis in the presence of repeated gauge field strength tensors and generalize to the cases including repeated fermion with generation larger than one, where non-trivial flavor symmetries can appear and are encoded in the symmetry properties of the Wilson coefficients [30, 32]. Obviously, this technique can also apply to the

operator form and obtain the f-basis monomial for each operator type/class and is exactly the meaning of the “operator” reported in tables in the rest of our paper, and the relevant concepts are first illustrated in ref. [30].

3 On-shell amplitude/operators in generic gravity EFTs

In this section, we list the Lorentz factors in Gravity EFTs up to dimension 10. We divide them into the following classes. Note that the operators on the right column are not in one-to-one correspondence to the amplitudes on the middle column since some of the corresponding amplitudes are too long to exhibit. Thus we put the independent monomials in this table, and the true physical amplitudes should be understood as the total (anti-)symmetrization of particle number labels of the identical bosons(fermions). For example, the dim-9 pure gravity operator C_L^4 , in the column of amplitudes, it gives a form of monomial $\langle 12 \rangle^4 \langle 34 \rangle^4$, the physical amplitude should be understood as:

$$\mathcal{A}_{\text{phys}}^{C_L^4} = \langle 12 \rangle^4 \langle 34 \rangle^4 + \text{symm} (1234). \quad (3.1)$$

Similarly, as an example, in the Einstein-Yang-Mills theory, for the operator type $C_L F_L^2 F_R^2$, the last amplitude should be symmetrized to:

$$\delta^{A_2 A_4} \delta^{A_3 A_5} \langle 12 \rangle^2 \langle 13 \rangle^3 [45]^2 \rightarrow \left(\delta^{A_2 A_4} \delta^{A_3 A_5} \langle 12 \rangle^2 \langle 13 \rangle^3 [45]^2 + \text{symm} (23) \right) + \text{symm} (45). \quad (3.2)$$

In the presence of fermion, the Wilson coefficients with flavor indices may present in the amplitude form, they are denoted in the following format:²

$$C_{\{f_i\}, \{f_j\}, \dots}^{PT_1, PT_2, \dots}, \quad (3.3)$$

where $PT_1, PT_2, \dots$ represent the shape of the Young diagrams corresponding to the irreducible representations of the permutation group for the repeated fermion fields,³ and $\{f_i\}, \{f_j\}, \dots$ are sets of flavor indices separated by commas for each group of repeated fermion fields. For example, for the operator class $C_L^2 \psi^2 \psi^\dagger^2$ of the Gravity-Fermion theory, the amplitude contains the Wilson coefficients $C_{f_3 f_4, f_5, f_6}^{[2], [2]}$, it tells that f_3, f_4 are flavor indices for identical particles annihilated by the repeated fields ψ , and f_5, f_6 are flavor indices for identical particles annihilated by the repeated fields $\psi^\dagger$. The superscript $[2], [2]$, denotes the partition and the shape of the Young diagrams denoting the irreducible representations of the Wilson coefficient under the symmetric group regarding to the permutation of the flavor indices f_3, f_4 and f_5, f_6 respectively. Here $[2]$ represents $\square$, which indicates that $C_{f_3 f_4, f_5, f_6}^{[2], [2]}$ are symmetric under the permutation of the either f_3, f_4 or f_5, f_6 . In more general cases, the Wilson coefficients tensor is said to have permutation symmetry of certain Young diagrams, meaning it is unchanged under the acting of the corresponding normalized Young symmetrizer of the standard Young tableau. For example, for the operator of the

²In principle, the Wilson coefficients also present in the amplitude for the operators without fermions, but in those cases, the corresponding Wilson coefficients are just one-dimension parameters, so we neglect them for notational convenience.

³In this section we only consider two kinds of neutral fermion ψ and $\psi^\dagger$ in the Gravity-Fermion theory.

class $C_L \psi^3 \psi^\dagger D$, the amplitude of which contains the Wilson coefficients $\mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]}$, and this coefficients has the following properties:

$$\mathcal{Y} \left(\begin{bmatrix} 2 & 3 \\ 4 \end{bmatrix} \right) \circ \mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]} = \frac{1}{3} \left(\mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]} + \mathcal{C}_{f_3 f_2 f_4, f_5}^{[2,1]} - \mathcal{C}_{f_4 f_3 f_2, f_5}^{[2,1]} - \mathcal{C}_{f_4 f_2 f_3, f_5}^{[2,1]} \right) \equiv \mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]}. \quad (3.4)$$

On the other hand, for the operator form, we use the Young symmetrizer $\mathcal{Y}$ to indicate the permutation symmetry of the corresponding Wilson coefficient that contracts with the operator in the Lagrangian term. It is pointed out at the beginning of the section 4.4 in ref. [32] that, after contracting with the flavor indices to form a Lagrangian term, demanding the permutation symmetry on the Wilson coefficient is equivalent to demanding the permutation symmetry on the corresponding operator.

Lastly, we comment that if the class has only one operator, then the operator and the amplitude are in one-to-one correspondence. For the operator class including fermions, if the operator of the particular permutation symmetry only has one component, then the operators on the right and the amplitudes on the left are one-to-one correspondence. Otherwise, the operator on the left may generate amplitude as a linear combination of the amplitude basis on the left. For example, for the operator class $C_L \psi^2 \psi^\dagger D^2$, we have only one operator that is totally symmetric under the exchange of flavor indices pr and st , the amplitude it generates must be the one proportional to $\mathcal{C}_{f_2 f_3, f_3 f_4}^{[2],[2]}$ on the left after proper symmetrization. This is not the case for the operator that is anti-symmetric under the exchange of the same set of flavor indices in the last two lines in this operator class, the amplitude $\mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[1,1]} \langle 12 \rangle \langle 13 \rangle^3 [34][35] + \text{anti-symm}(23) + \text{anti-symm}(45)$ should be generated by the linear combination of the operators in the last two lines in the right column.

3.1 Pure gravity

First, we list the local amplitudes and effective operators for pure gravity. Note that C_L and C_R are viewed as different fields that annihilate the different particles in the amplitude.

Pure Gravity

dimension	class	amplitude	operator
dim-6	C_L^3	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\delta} C_{L\lambda\delta}{}^{\rho\sigma}$
dim-8	C_L^4	$\langle 12 \rangle^4 \langle 34 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{L\lambda\eta\xi\tau} C_L^{\lambda\eta\xi\tau}$
	$C_L^2 C_R^2$	$\langle 12 \rangle^4 [34]^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{R\lambda\eta\xi\tau} C_R^{\lambda\eta\xi\tau}$
dim-10	$C_L^4 D^2$	$\langle 12 \rangle^4 \langle 34 \rangle^4 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\zeta C_{L\lambda\eta\xi\tau} D^\zeta C_L^{\lambda\eta\xi\tau}$
	$C_L^2 C_R^2 D^2$	$\langle 12 \rangle^2 [34]^2 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\zeta C_{R\lambda\eta\xi\tau} D^\zeta C_R^{\lambda\eta\xi\tau}$
	C_L^5	$\langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2$	$C_{L\mu\nu\lambda\rho} C_{L\tau\nu\phi\chi} C_L^{\mu\nu\eta\xi} C_L^{\tau\nu\phi\chi} C_{L\eta\xi}{}^{\lambda\rho}$
	$C_L^3 C_R^2$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 [34]^4$	$C_{L\mu\nu\lambda\rho} C_{R\tau\nu\phi\chi} C_L^{\mu\nu\eta\xi} C_R^{\tau\nu\phi\chi} C_{L\eta\xi}{}^{\lambda\rho}$

3.2 Scalar gravity (including Goldstone scalar)

Second, we list the amplitudes and operators in Gravity EFT with an extra scalar. To concentrate on the Lorentz structure, the scalar is set to be hermitian and a singlet under

any gauge group.

Scalar Gravity

dimension	class	amplitude	operator
dim-5	$C_L^2 \phi$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi$
dim-6	$C_L^2 \phi^2$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^2$
dim-7	$C_L^3 \phi$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} \phi$
	$C_L^2 \phi^3$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^3$
dim-8	$C_L^2 \phi^2 D^2$	$\langle 12 \rangle^4 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\lambda \phi D^\lambda \phi$
	$C_L^3 \phi^2$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} \phi^2$
	$C_L^2 \phi^4$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^4$
dim-9	$C_L \phi^3 D^4$	$\langle 13 \rangle^2 \langle 14 \rangle^2 [34]^2$	$C_L^{\mu\nu\rho\sigma} \phi D_\mu D_\nu \phi D_\rho D_\sigma \phi$
	$C_L^4 \phi$	$\langle 12 \rangle^4 [34]^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{L\eta\lambda\xi\tau} C_L^{\eta\lambda\xi\tau} \phi$
	$C_L^2 C_R^2 \phi$	$\langle 12 \rangle^4 [34]^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{R\eta\lambda\xi\tau} C_R^{\eta\lambda\xi\tau} \phi$
	$C_L^2 \phi^3 D^2$	$\langle 12 \rangle^4 s_{45}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi D_\lambda \phi D^\lambda \phi$
	$C_L^3 \phi^3$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} \phi^3$
	$C_L^2 \phi^5$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^5$
dim-10	$C_L^2 \phi^2 D^4$	$\langle 12 \rangle^4 s_{34}^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\lambda D_\eta \phi D^\lambda D^\eta \phi$
		$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 [34]^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} D_\lambda D_\eta \phi D^\rho D^\sigma \phi$
	$C_L C_R \phi^2 D^4$	$\langle 13 \rangle^4 [23]^4$	$C_{L\mu\nu\rho\sigma} C_R^{\eta\nu\lambda\sigma} \phi D_\lambda D_\eta D^\rho D^\mu \phi$
	$C_L^3 \phi^2 D^2$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 s_{45}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} D_\xi \phi D^\xi \phi$
	$C_L \phi^4 D^4$	$\langle 14 \rangle^2 \langle 15 \rangle^2 [45]^2$	$C_L^{\mu\nu\rho\sigma} \phi^2 D_\mu D_\nu \phi D_\rho D_\sigma \phi$
	$C_L^4 \phi^2$	$\langle 12 \rangle^4 [34]^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{L\eta\lambda\xi\tau} C_L^{\eta\lambda\xi\tau} \phi^2$
	$C_L^2 C_R^2 \phi^2$	$\langle 12 \rangle^4 [34]^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{R\eta\lambda\xi\tau} C_R^{\eta\lambda\xi\tau} \phi^2$
	$C_L^2 \phi^4 D^2$	$\langle 12 \rangle^4 s_{56}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^2 D_\lambda \phi D^\lambda \phi$
	$C_L^3 \phi^4$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} \phi^4$
	$C_L^2 \phi^6$	$\langle 12 \rangle^4$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} \phi^6$

In addition, we also consider the case when the scalar is a Goldstone boson for which amplitudes must satisfy the Adler's zero condition [39–42]. For simplicity, the Goldstone field a comes from a broken U(1) and thus has only one flavor, and we adopt the operator building block $U = e^{ia/f}$. In the leading order, the following operators should be expressed by the building block a via the simple relation $D_\mu U \simeq D_\mu a$.

including Goldstone scalar

dimension	class	amplitude	operator
dim-8	$C_L^2 U^2 D^2$	$\langle 12 \rangle^4 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\lambda U D^\lambda U$
dim-9	$C_L U^3 D^4$	$\langle 13 \rangle^2 \langle 14 \rangle^2 [34]^2$	$C_{L\mu\nu\rho\sigma} D^\mu U D^\nu U D^\rho D^\sigma U$
dim-10	$C_L^2 U^2 D^4$	$\langle 12 \rangle^4 s_{34}^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\lambda D_\eta U D^\lambda D^\eta U$
		$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 [34]^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} D_\lambda D_\eta U D^\rho D^\sigma U$
	$C_L C_R U^2 D^4$	$\langle 13 \rangle^4 [23]^4$	$C_{L\mu\nu\rho\sigma} C_R^{\eta\nu\lambda\sigma} D_\lambda D_\eta U D^\rho D^\mu U$
	$C_L^3 U^2 D^2$	$\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 s_{45}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}^{\rho\sigma} D_\xi U D^\xi U$
	$C_L U^4 D^4$	$\langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle [23][45]$	$C_L^{\mu\nu\rho\sigma} D_\mu U D_\nu U D_\rho U D_\sigma U$

3.3 Einstein-Yang-Mills

Here we list the amplitudes and operators in Gravity EFT with an extra SU(3) group. The gauge boson in SU(3) group is written as G_L and G_R responsible for the creation of gauge boson particles of two polarizations respectively. A_i in amplitudes is the gauge index for particle i . They have the same formula for general SU(N) group, since the structural constants δ^{AB} , f^{ABC} and d^{ABC} also apply to SU(N) via Fierz identity $T_{ab}^A T_{cd}^A = \delta_{ad}\delta_{cb} - \frac{1}{N}\delta_{ab}\delta_{cd}$. Thus the above structural constants are enough. In the case of not much gauge boson.

including Yang Mills

dimension	class	amplitude	operator
dim-6	$C_L F_L^2$	$\delta^{A_2 A_3} \langle 12 \rangle^2 \langle 13 \rangle^2$	$C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{A\rho\sigma}$
dim-8	$C_L^2 F_L^2$	$\delta^{A_3 A_4} \langle 12 \rangle^4 \langle 34 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_{L\mu\nu\rho\sigma} G_L^A{}_{\lambda\zeta} G_L^{A\lambda\zeta}$
		$\delta^{A_3 A_4} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_{L\mu\nu\rho\sigma} G_L^A{}_{\lambda\zeta} G_L^{A\lambda\zeta}$
	$C_R^2 F_L^2$	$\delta^{A_1 A_2} \langle 12 \rangle^2 [34]^4$	$C_{R\mu\nu\rho\sigma} C_{R\mu\nu\rho\sigma} G_L^A{}_{\lambda\zeta} G_L^{A\lambda\zeta}$
dim-10	$C_L F_L^3 D^2$	$f^{A_2 A_3 A_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle s_{34}$	$f^{ABC} C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} D^\xi G_L^{B\rho\lambda} D_\xi G_L^C{}_{\lambda\sigma}$
	$C_L^2 F_L^2 D^2$	$\delta^{A_3 A_4} \langle 12 \rangle^4 \langle 34 \rangle^2 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_{\mu'} G_L^A{}_{\nu'\rho'} D^{\mu'} G_L^{A\nu'\rho'}$
		$\delta^{A_3 A_4} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\xi} D_\eta G_L^{A\rho\sigma} D_\eta G_L^A{}_{\lambda\xi}$
	$C_L F_L^2 F_R D^2$	$f^{A_2 A_3 A_4} \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle [34]^2$	$D_\mu C_{L\lambda\rho\eta\nu} D^\nu G_L^{A\rho\mu} G_L^B{}_{\lambda\xi} \eta G_R^{C\xi\lambda}$
	$C_L^2 F_L F_R D^2$	$\delta^{A_3 A_4} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 [34]^2$	$D_\mu D_\nu C_{L\lambda\rho\eta\xi} C_L^{\rho\nu\xi\mu} G_L^A{}_{\tau\eta} \eta G_R^{A\tau\lambda}$
	$C_L^2 F_R^2 D^2$	$\delta^{A_3 A_4} \langle 12 \rangle^4 [34]^2 s_{34}$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} D_\lambda G_L^A{}_{\eta\xi} D^\lambda G_L^{A\eta\xi}$
	$F_L^2 F_R C_R D^2$	$f^{A_1 A_2 A_3} \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle [34]^4$	$f^{ABC} D_\mu G_L^A{}_{\rho\sigma} D_\nu G_L^B{}_{\lambda\eta} G_R^{C\mu\nu} C_R^{\rho\sigma\lambda\eta}$
	$C_L C_R F_L F_R D^2$	$\delta^{A_2 A_3} \langle 12 \rangle^2 \langle 13 \rangle^2 [34]^4$	$C_{L\mu\nu\rho\sigma} D^\mu D^\rho G_L^A{}_{\eta\xi} G_R^B{}_{\lambda\zeta} C^{\sigma\eta\lambda\xi}$
	$C_L F_L^4$	$d^{A_2 A_3 E} d^{A_4 A_5 E} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2$	$d^{ABE} d^{CDE} C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{B\rho\sigma} G_L^{C\lambda\eta} G_L^D{}_{\lambda\eta}$
		$d^{A_2 A_3 E} d^{A_4 A_5 E} \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2$	$d^{ABE} d^{CDE} C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{C\rho\sigma} G_L^{B\lambda\eta} G_L^D{}_{\lambda\eta}$
		$f^{A_2 A_3 E} f^{A_4 A_5 E} \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2$	$f^{ABE} f^{CDE} C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{C\rho\sigma} G_L^{B\lambda\eta} G_L^D{}_{\lambda\eta}$
	$C_L^2 F_L^3$	$f^{A_3 A_4 A_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \langle 45 \rangle$	$f^{ABC} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} G_L^A{}_{\lambda\eta} G_L^{B\eta\xi} G_L^C{}_{\xi\lambda}$
	$C_L^3 F_L^2$	$\delta^{A_4 A_5} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} C_{L\lambda\eta\tau\xi} G_L^{A\lambda\eta} G_L^{A\tau\xi}$
		$\delta^{A_4 A_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}{}^{\rho\sigma} G_L^{A\tau\xi} G_L^A{}_{\tau\xi}$
	$C_L^2 F_R^3$	$f^{A_3 A_4 A_5} \langle 12 \rangle^4 [34][35][45]$	$f^{ABC} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} G_R^A{}_{\lambda\eta} G_R^{B\eta\xi} G_R^C{}_{\xi\lambda}$
	$C_L F_L^2 C_R^2$	$\delta^{A_2 A_3} \langle 12 \rangle^2 \langle 13 \rangle^2 [45]^4$	$C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{A\rho\sigma} C_{R\lambda\eta\tau\xi} C_R^{\lambda\eta\tau\xi}$
	$C_L F_L^2 F_R^2$	$d^{A_2 A_3 E} d^{A_4 A_5 E} \langle 12 \rangle^2 \langle 13 \rangle^2 [45]^2$	$d^{ABE} d^{CDE} C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{B\rho\sigma} G_R^C{}_{\lambda\eta} G_R^D{}_{\lambda\eta}$
		$\delta^{A_2 A_3} \delta^{A_4 A_5} \langle 12 \rangle^2 \langle 13 \rangle^3 [45]^2$	$C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{A\rho\sigma} G_R^B{}_{\lambda\eta} G_R^{B\lambda\eta}$
		$\delta^{A_2 A_4} \delta^{A_3 A_5} \langle 12 \rangle^2 \langle 13 \rangle^3 [45]^2$	$C_{L\mu\nu\rho\sigma} G_L^{A\mu\nu} G_L^{B\rho\sigma} G_R^A{}_{\lambda\eta} G_R^{B\lambda\eta}$
	$C_L^3 F_R^2$	$\delta^{A_4 A_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 [45]^2$	$C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}{}^{\rho\sigma} G_R^A{}_{\tau\xi} G_R^{A\tau\xi}$

3.4 Gravity + fermion

Here we list the amplitudes and operators in Gravity EFT with two extra neutral fermions with opposite helicities. Similarly, the fermions are singlet under any gauge group, but carry flavor indices f_i for each fermion i . The Wilson coefficients $\mathcal{C}$ s are also irreducible flavor

tensors of the corresponding repeated fermion fields, and the superscripts denote the shapes of the Young diagrams representing the permutation symmetries of the corresponding flavor indices. The amplitudes and operators are similar for massive fermion, except the massive spinors have extra little group indices [33, 43].

including Fermion

dimension	class	amplitude	operator
dim-7	$C_L^2 \psi^2$	$\mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^4 \langle 34 \rangle$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} (\psi_p \psi_r)$
	$C_L^2 \psi^{\dagger 2}$	$\mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^4 [34]$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} (\psi_p^\dagger \psi_r^\dagger)$
dim-8	$C_L \psi^4$	$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[4]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_L^{\mu\nu\rho\sigma} (\psi_p \sigma_{\mu\nu} \psi_r) (\psi_s \sigma_{\rho\sigma} \psi_t)$
dim-9	$C_L^2 \psi^2 D^2$	$\mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^4 \langle 34 \rangle s_{34}$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} (D_\lambda \psi_p D^\lambda \psi_r)$
		$\mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 [34]$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho}{}^\eta D^\lambda C_L^{\mu\nu\rho\sigma} (D_\lambda \psi_p \sigma_{\eta\sigma} \psi_r)$
	$C_L^2 \psi^{\dagger 2} D^2$	$\mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^4 [34] s_{34}$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\rho\sigma} (D_\lambda \psi_p^\dagger D^\lambda \psi_r^\dagger)$
	$C_L^3 \psi^2$	$\mathcal{C}_{f_4 f_5}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}{}^{\rho\sigma} (\psi_p \psi_r)$
	$C_L^3 \psi^{\dagger 2}$	$\mathcal{C}_{f_4 f_5}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 [45]$	$\mathcal{Y}_{[p r]} C_{L\mu\nu\rho\sigma} C_L^{\mu\nu\lambda\eta} C_{L\lambda\eta}{}^{\rho\sigma} (\psi_p^\dagger \psi_r^\dagger)$
	$C_L \psi^3 \psi^\dagger D$	$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[2,1]} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle [35]$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \end{smallmatrix}} C_{L\mu\nu\rho\eta} (\psi_p \sigma^{\mu\nu} \psi_r) (D^\rho \psi_s \sigma^\eta \psi_t^\dagger)$
dim-10	$C_L^2 \psi \psi^\dagger D^3$	$\mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle [34]^2$	$C_{L\mu\nu\rho\eta} C_L^{\mu\nu\lambda\xi} (D^\rho D^\eta \psi_p \sigma_\lambda D_\xi \psi_r^\dagger)$
	$C_L C_R \psi \psi^\dagger D^3$	$\mathcal{C}_{f_3, f_4} \langle 13 \rangle \langle 14 \rangle^3 [24]^4$	$C_{L\mu\nu\rho\eta} C_R^{\lambda\nu\xi\eta} (D^\mu D^\rho \psi_p \sigma_\lambda D_\xi \psi_r^\dagger)$
	$C_L \psi^4 D^2$	$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[4]} \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle [35]$	$\mathcal{Y}_{[p r s t]} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^{\rho\eta} D^\nu \psi_r) (\psi_s \psi_t)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[3,1]} \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle [35]$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^{\rho\eta} D^\nu \psi_r) (\psi_s \psi_t)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[2,2]} \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle [35]$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^{\rho\eta} D^\nu \psi_r) (\psi_s \psi_t)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[2,1,1]} \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle [35]$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^{\rho\eta} \psi_r) (D^\nu \psi_s \psi_t)$
	$C_L \psi^2 \psi^{\dagger 2} D^2$	$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[2],[2]} \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle [35][45]$	$\mathcal{Y}_{[p r],[s t]} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^\rho \psi_s^\dagger) (D^\nu \psi_r \sigma^\eta \psi_t^\dagger)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[2],[1,1]} \langle 12 \rangle \langle 13 \rangle^3 [34][35]$	$\mathcal{Y}_{[p r],[s t]} C_{L\mu\nu\rho\eta} (D^\mu D^\rho \psi_p \sigma^\nu \psi_s^\dagger) (\psi_r \sigma^\eta \psi_t^\dagger)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[1,1],[1,1]} \langle 12 \rangle \langle 13 \rangle^3 [34][35]$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} (D^\mu D^\rho \psi_p \sigma^\nu \psi_s^\dagger) (\psi_r \sigma^\eta \psi_t^\dagger)$
		$\mathcal{C}_{f_2 f_3 f_4 f_5}^{[1,1],[1,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle [45]^2$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} (D^\mu \psi_p \sigma^\nu \psi_s^\dagger) (D^\rho \psi_r \sigma^\eta \psi_t^\dagger)$
	$C_L^2 \psi^4$	$\mathcal{C}_{f_3 f_4 f_5 f_6}^{[2,2]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\rho\eta} C_L^{\mu\nu\rho\eta} (\psi_p \psi_r) (\psi_s \psi_t)$
		$\mathcal{C}_{f_3 f_4 f_5 f_6}^{[1,1,1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}{}^{\lambda\rho} (\psi_p \sigma^{\mu\nu} \psi_r) (\psi_s \sigma^{\eta\xi} \psi_t)$
	$C_L^2 \psi^2 \psi^{\dagger 2}$	$\mathcal{C}_{f_3 f_4 f_5 f_6}^{[2],[2]} \langle 12 \rangle^4 \langle 34 \rangle [56]$	$\mathcal{Y}_{[p r],[s t]} C_{L\mu\nu\rho\eta} C_L^{\mu\nu\rho\eta} (\psi_p \psi_r) (\psi_s^\dagger \psi_t^\dagger)$
	$C_R^2 \psi^4$	$\mathcal{C}_{f_3 f_4 f_5 f_6}^{[2,2]} [12]^4 \langle 34 \rangle \langle 56 \rangle$	$\mathcal{Y}_{\begin{smallmatrix} p \\ r \\ s \\ t \end{smallmatrix}} C_{R\mu\nu\rho\eta} C_R^{\mu\nu\rho\eta} (\psi_p \psi_r) (\psi_s \psi_t)$

4 GRSMEFT operator/amplitude bases up to dim-10

In this section, we list the on-shell amplitude bases and the operator bases in the GRSMEFT up to the mass dimension 10. Note that the amplitudes are not in one-to-one correspondence with the operators even though they are put side-by-side, but these are both complete and independent bases related by linear transformations from the operator-amplitude correspondence perspective. Similar to the amplitude in the previous section, the amplitude in the GRSMEFT should totally symmetrize over the particle number indices associated with the identical particles of bosons (including graviton, gauge bosons, and Higgs boson),

Fields	$SU(2)_l \times SU(2)_r$	h	$SU(3)_C$	$SU(2)_W$	$U(1)_Y$	Flavor
$C_{L\alpha\beta\gamma\delta}$	$(2, 0)$	-2	1	1	0	1
$G_{L\alpha\beta}^A$	$(1, 0)$	-1	8	1	0	1
$W_{L\alpha\beta}^I$	$(1, 0)$	-1	1	3	0	1
$B_{L\alpha\beta}$	$(1, 0)$	-1	1	1	0	1
$L_{\alpha i}$	$\left(\frac{1}{2}, 0\right)$	$-1/2$	1	2	$-1/2$	n_f
$e_{\mathbb{C}\alpha}$	$\left(\frac{1}{2}, 0\right)$	$-1/2$	1	1	1	n_f
$Q_{\alpha ai}$	$\left(\frac{1}{2}, 0\right)$	$-1/2$	3	2	$1/6$	n_f
$u_{\mathbb{C}\alpha}^a$	$\left(\frac{1}{2}, 0\right)$	$-1/2$	$\bar{\mathbf{3}}$	1	$-2/3$	n_f
$d_{\mathbb{C}\alpha}^a$	$\left(\frac{1}{2}, 0\right)$	$-1/2$	$\bar{\mathbf{3}}$	1	$1/3$	n_f
H_i	$(0, 0)$	0	1	2	$1/2$	1

Table 1. The field content of the GRSMEFT, along with their representations under the Lorentz and gauge groups. The representation under Lorentz group is denoted by (j_l, j_r) , while the helicity of the field is given by $h = j_r - j_l$. The number of fermion flavors is denoted as n_f , and $n_f = 3$ in the GRSMEFT. All of the fields are accompanied with their Hermitian conjugates that are omitted, $(C_{L\alpha\beta\gamma\delta})^\dagger = C_{R\dot{\alpha}\dot{\beta}\dot{\gamma}\dot{\delta}}$ for gravitons, $(F_{L\alpha\beta})^\dagger = F_{R\dot{\alpha}\dot{\beta}}$ for gauge bosons, $(\psi_\alpha)^\dagger = (\psi^\dagger)_{\dot{\alpha}}$ for fermions, and $H^\dagger$ for the Higgs, which are under the conjugate representations of all the Lorentz and gauge groups.

and totally anti-symmetrize over the particle number indices associated with the identical fermions as explained by examples at the beginning of section. 3

4.1 Field contents

The field content of GRSMEFT are listed in table 1. The operators are constructed in two-component Weyl spinor notation and then converted to four-component Dirac spinor notation using the following relations:

$$q_L = \begin{pmatrix} Q \\ 0 \end{pmatrix}, \quad u_R = \begin{pmatrix} 0 \\ u_{\mathbb{C}}^\dagger \end{pmatrix}, \quad d_R = \begin{pmatrix} 0 \\ d_{\mathbb{C}}^\dagger \end{pmatrix}, \quad l_L = \begin{pmatrix} L \\ 0 \end{pmatrix}, \quad e_R = \begin{pmatrix} 0 \\ e_{\mathbb{C}}^\dagger \end{pmatrix}. \quad (4.1)$$

$$\bar{q}_L = (0, Q^\dagger), \quad \bar{u}_R = (u_{\mathbb{C}}, 0), \quad \bar{d}_R = (d_{\mathbb{C}}, 0), \quad \bar{l}_L = (0, L^\dagger), \quad \bar{e}_R = (e_{\mathbb{C}}, 0). \quad (4.2)$$

4.2 Dim-6 operator and amplitude bases

Class $C_L F_L^2$: 3 types

$$\mathcal{O}_{C_L B_L^2} |B_{L\lambda\rho} B_{L\mu\nu} C_L^{\lambda\rho\mu\nu}| \langle 12 \rangle^2 \langle 13 \rangle^2 | \quad (4.3)$$

$$\mathcal{O}_{C_L W_L^2} |C_L^{\lambda\rho\mu\nu} W_{L\lambda\rho}^I W_{L\mu\nu}^I| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} | \quad (4.4)$$

$$\mathcal{O}_{C_L G_L^2} |C_L^{\lambda\rho\mu\nu} G_{L\lambda\rho}^A G_{L\mu\nu}^A| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} | \quad (4.5)$$

Class C_L^3 : 1 types

$$\mathcal{O}_{C_L^3} |C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}{}^{\lambda\rho}| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 | \quad (4.6)$$

Class $C_L^2\phi^2$: 1 types

$$\mathcal{O}_{C_L^2 HH^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \langle 12 \rangle^4 \delta_{i_4}^{i_3} \quad (4.7)$$

4.3 Dim-8 operator and amplitude bases

Class $C_L F_L^3$: 2 types

$$\mathcal{O}_{C_L B_L W_L^2} \left| C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} W_L^{I\mu\nu} B_{L\eta}^\rho \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{I_3 I_4} \quad (4.8)$$

$$\mathcal{O}_{C_L B_L G_L^2} \left| C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} G_L^{A\mu\nu} B_{L\eta}^\rho \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{A_3 A_4} \quad (4.9)$$

Class $C_L^2 F_L^2$: 3 types

$$\mathcal{O}_{C_L^2 B_L^2}^{(1,2)} \left| \begin{array}{l} B_{L\eta\xi} B_L^{\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \langle 12 \rangle^4 \langle 34 \rangle^2 \\ B_L^{\eta\xi} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \end{array} \right| \quad (4.10)$$

$$\mathcal{O}_{C_L^2 W_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_L^{I\eta\xi} W_L^{I\mu\nu} \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{I_3 I_4} \\ C_{L\mu\nu\lambda\rho} W_L^{I\eta\xi} W_L^{I\mu\nu} C_{L\eta\xi}^{\lambda\rho} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta^{I_3 I_4} \end{array} \right| \quad (4.11)$$

$$\mathcal{O}_{C_L^2 G_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\mu\nu} \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{A_3 A_4} \\ C_{L\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\mu\nu} C_{L\eta\xi}^{\lambda\rho} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta^{A_3 A_4} \end{array} \right| \quad (4.12)$$

Class C_L^4 : 1 types

$$\mathcal{O}_{C_L^4} \left| C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\eta\xi\tau\nu} C_L^{\mu\nu\lambda\rho} \right| \langle 12 \rangle^4 \langle 34 \rangle^4 \quad (4.13)$$

Class $C_L F_L \psi \bar{\psi} D$: 10 types

$$\mathcal{O}_{C_L B_L \bar{e}_R e_R D} \left| C_{L\nu\lambda\rho}^\mu \left(D_\mu B_L^{\nu\lambda} \right) \left(\bar{e}_R p \gamma^\rho e_R r \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (4.14)$$

$$\mathcal{O}_{C_L B_L \bar{l} l D} \left| C_{L\nu\lambda\rho}^\mu \left(D_\mu B_L^{\nu\lambda} \right) \left(\bar{l}_R^i \gamma^\rho l_{Lpi} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \quad (4.15)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R D} \left| C_{L\nu\lambda\rho}^\mu \left(D_\mu B_L^{\nu\lambda} \right) \left(\bar{d}_R^a \gamma^\rho d_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \quad (4.16)$$

$$\mathcal{O}_{C_L B_L \bar{u}_R u_R D} \left| C_{L\nu\lambda\rho}^\mu \left(D_\mu B_L^{\nu\lambda} \right) \left(\bar{u}_R^a \gamma^\rho u_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \quad (4.17)$$

$$\mathcal{O}_{C_L B_L \bar{q} q D} \left| C_{L\nu\lambda\rho}^\mu \left(D_\mu B_L^{\nu\lambda} \right) \left(\bar{q}_L^{ai} \gamma^\rho q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \quad (4.18)$$

$$\mathcal{O}_{C_L W_L \bar{l} l D} \left| \tau_j^{Ii} C_{L\nu\lambda\rho}^\mu \left(D_\mu W_L^{I\nu\lambda} \right) \left(\bar{l}_R^j \gamma^\rho l_{Lpi} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\tau^{I_2} \right)_{i_4}^{i_3} \quad (4.19)$$

$$\mathcal{O}_{C_L W_L \bar{q} q D} \left| \tau_j^{Ii} C_{L\nu\lambda\rho}^\mu \left(D_\mu W_L^{I\nu\lambda} \right) \left(\bar{q}_L^{aj} \gamma^\rho q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \left(\tau^{I_2} \right)_{i_4}^{i_3} \quad (4.20)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_R D} \left| \lambda_a^{Ab} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{d}_R^a \gamma^\rho d_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (4.21)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_R D} \left| \lambda_a^{Ab} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{u}_R^a \gamma^\rho u_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (4.22)$$

$$\mathcal{O}_{C_L G_L \bar{q} q D} \left| \lambda_a^{Ab} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{q}_L^{bi} \gamma^\rho q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \left(\lambda^{A_2} \right)_{a_4}^{a_3} \quad (4.23)$$

Class $C_L \psi^2 \phi D^2$: 3 types

$$\mathcal{O}_{C_L \bar{e}_R l H^\dagger D^2} \left| H^{\dagger i} C_{L\lambda\rho}^{\nu\mu} \left((D_\mu \bar{e}_R p) \sigma^{\lambda\rho} (D_\nu l_{Lri}) \right) \right| \mathcal{C}_{f_2, f_3} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \quad (4.24)$$

$$\mathcal{O}_{C_L \bar{d}_R q H^\dagger D^2} \left| H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} \left(\left(D_\mu \bar{d}_{Rp}^a \right) \sigma^{\lambda\rho} \left(D_\nu q_{Lrai} \right) \right) \right| \mathcal{C}_{f_2, f_3} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \left| \quad (4.25) \right.$$

$$\mathcal{O}_{C_L q \bar{u}_R H D^2} \left| \epsilon^{ij} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(\left(D_\nu \bar{u}_{Rr}^a \right) \sigma^{\lambda\rho} \left(D_\mu q_{Lpai} \right) \right) \right| \mathcal{C}_{f_2, f_3} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \left| \quad (4.26) \right.$$

Class $C_L F_L \phi^2 D^2$: 2 types

$$\mathcal{O}_{C_L B_L H H^\dagger D^2} \left| H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu B_L^{\lambda\rho} \right) \right| [34] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \left| \quad (4.27) \right.$$

$$\mathcal{O}_{C_L W_L H H^\dagger D^2} \left| \tau_j^{I_i} H^{\dagger j} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu W_L^{I\lambda\rho} \right) \right| [34] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\tau^{I_2} \right)_{i_4}^{i_3} \left| \quad (4.28) \right.$$

Class $C_L^2 \phi^2 D^2$: 1 types

$$\mathcal{O}_{C_L^2 H H^\dagger D^2} \left| H_i H^{\dagger i} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \right| s_{34} \langle 12 \rangle^4 \delta_{i_4}^{i_3} \left| \quad (4.29) \right.$$

Class $C_R^2 F_L^2$: 3 types

$$\mathcal{O}_{C_R^2 B_L^2} \left| B_{L\mu\nu} B_L^{\mu\nu} C_{R\lambda\rho\eta\xi} C_R^{\lambda\rho\eta\xi} \right| [34]^4 \langle 12 \rangle^2 \left| \quad (4.30) \right.$$

$$\mathcal{O}_{C_R^2 W_L^2} \left| C_{R\lambda\rho\eta\xi} C_R^{\lambda\rho\eta\xi} W_{L\mu\nu}^I W_L^{I\mu\nu} \right| [34]^4 \langle 12 \rangle^2 \delta_{I_1 I_2} \left| \quad (4.31) \right.$$

$$\mathcal{O}_{C_R^2 G_L^2} \left| C_{R\lambda\rho\eta\xi} C_R^{\lambda\rho\eta\xi} G_{L\mu\nu}^A G_L^{A\mu\nu} \right| [34]^4 \langle 12 \rangle^2 \delta^{A_1 A_2} \left| \quad (4.32) \right.$$

Class $C_L^2 C_R^2$: 1 types

$$\mathcal{O}_{C_L^2 C_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} \right| [34]^4 \langle 12 \rangle^4 \left| \quad (4.33) \right.$$

Class $C_L \psi^4$: 4 types

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R \bar{u}_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma^{\mu\nu} C \bar{u}_{Rt}^c \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon_{a_2 a_4 a_5} \left| \quad (4.34) \right.$$

$$\mathcal{O}_{C_L \bar{e}_R l q \bar{u}_R} \left| \epsilon^{ij} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} l_{Lri} \right) \left(\bar{u}_{Rt}^a \sigma^{\mu\nu} q_{Lsa j} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_5}^{a_4} \epsilon^{i_3 i_4} \left| \quad (4.35) \right.$$

$$\mathcal{O}_{C_L \bar{d}_R q^2 \bar{u}_R}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsa j} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \epsilon^{i_3 i_4} \left| \right.$$

$$\left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsa j} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \epsilon^{i_3 i_4} \left| \quad (4.36) \right.$$

$$\mathcal{O}_{C_L l q^3} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \\ t \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\mu\nu\lambda\rho} \left(l_{Lpi} C \sigma^{\lambda\rho} q_{Lra j} \right) \left(q_{Lsbk} C \sigma^{\mu\nu} q_{Ltd} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \left| \quad (4.37) \right.$$

Class $C_L F_L \psi^2 \phi$: 8 types

$$\mathcal{O}_{C_L B_L \bar{e}_R l H^\dagger} \left| H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \left| \quad (4.38) \right.$$

$$\mathcal{O}_{C_L B_L \bar{d}_R q H^\dagger} \left| H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \left| \quad (4.39) \right.$$

$$\mathcal{O}_{C_L B_L q \bar{u}_R H} \left| \epsilon^{ij} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \left| \quad (4.40) \right.$$

$$\mathcal{O}_{C_L W_L \bar{e}_R l H^\dagger} \left| \tau_j^{I_i} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\tau^{I_2} \right)_{i_5}^{i_4} \left| \quad (4.41) \right.$$

$$\mathcal{O}_{C_L W_L \bar{d}_R q H^\dagger} \left| \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \left(\tau^{I_2} \right)_{i_5}^{i_4} \quad (4.42)$$

$$\mathcal{O}_{C_L W_L q \bar{u}_R H} \left| \tau_k^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} \left(\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau^{I_2} \right)_k^{i_3} \quad (4.43)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R q H^\dagger} \left| \lambda_a^{Ab} H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (4.44)$$

$$\mathcal{O}_{C_L G_L q \bar{u}_R H} \left| \lambda_b^{Aa} \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} \left(\bar{u}_{Rr}^b \sigma^{\mu\nu} q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_4}^{a_3} \quad (4.45)$$

Class $C_L F_L^2 \phi^2$: 4 types

$$\mathcal{O}_{C_L B_L^2 H H^\dagger} \left| H_i H^{\dagger i} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \quad (4.46)$$

$$\mathcal{O}_{C_L B_L W_L H H^\dagger} \left| \tau_j^{Ii} H_i H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\tau^{I_3} \right)_{i_5}^{i_4} \quad (4.47)$$

$$\mathcal{O}_{C_L W_L^2 H H^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{I_2 I_3} \quad (4.48)$$

$$\mathcal{O}_{C_L G_L^2 H H^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{A_2 A_3} \quad (4.49)$$

Class $C_L^2 \psi^2 \phi$: 3 types

$$\mathcal{O}_{C_L^2 \bar{e}_R l H^\dagger} \left| \left(\bar{e}_{Rp} l_{Lri} \right) H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \quad (4.50)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R q H^\dagger} \left| \left(\bar{d}_{Rp}^a q_{Lrai} \right) H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \quad (4.51)$$

$$\mathcal{O}_{C_L^2 q \bar{u}_R H} \left| \left(\bar{u}_{Rr}^a q_{Lpai} \right) \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \quad (4.52)$$

Class $C_L^3 \phi^2$: 1 types

$$\mathcal{O}_{C_L^3 H H^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{i_5}^{i_4} \quad (4.53)$$

Class $C_L^2 \bar{\psi}^2 \phi$: 3 types

$$\mathcal{O}_{C_L^2 \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \quad (4.54)$$

$$\mathcal{O}_{C_L^2 e_R \bar{l} H} \left| \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \delta_{i_5}^{i_3} \quad (4.55)$$

$$\mathcal{O}_{C_L^2 d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \quad (4.56)$$

Class $C_L^2 \phi^4$: 1 types

$$\mathcal{O}_{C_L^2 H^2 H^{\dagger 2}} \left| H_i H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \quad (4.57)$$

4.4 Dim-9 operator and amplitude bases

Class $C_L \psi^3 \bar{\psi} D$: 3 types

$$\mathcal{O}_{C_L \bar{d}_R l^2 u_R D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon^{ij} C_{L\nu\lambda\rho}^\mu \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho u_{Rta} \right) \left(l_{Lri} C \sigma^{\nu\lambda} l_{Lsj} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_4} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon^{ij} C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho u_{Rta} \right) \left(\left(D_\mu l_{Lri} \right) C \sigma^{\nu\lambda} l_{Lsj} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_4} \quad (4.58)$$

$$\mathcal{O}_{C_L \bar{d}_R^2 l \bar{q} D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon_{abc} C_{L\nu\lambda\rho}{}^\mu \left(\bar{d}_{Rr}^b \sigma^{\nu\lambda} l_{Lsi} \right) \left(\bar{q}_{Lt}^{ci} \gamma^\rho C \left(D_\mu \bar{d}_{Rp}^a \right) \right) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_4} \epsilon_{a_2 a_3 a_5} \left| \right. \\ \left. \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon_{abc} C_{L\nu\lambda\rho}{}^\mu \left(\bar{d}_{Rr}^b \sigma^{\nu\lambda} l_{Lsi} \right) \left(\bar{q}_{Lt}^{ci} \gamma^\rho C \left(D_\mu \bar{d}_{Rp}^a \right) \right) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_4} \epsilon_{a_2 a_3 a_5} \left| \right. \quad (4.59)$$

$$\mathcal{O}_{C_L \bar{d}_R^3 e_R D} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon_{abc} C_{L\nu\lambda\rho}{}^\mu \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho e_{Rt} \right) \left(\bar{d}_{Rr}^b \sigma^{\nu\lambda} C \bar{d}_{Rs}^c \right) \right| \mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon_{a_2 a_3 a_4} \left| \right. \quad (4.60)$$

Class $C_L \psi^2 \phi^2 D^2$: 1 types

$$\mathcal{O}_{C_L l^2 H^2 D^2}^{(1\sim 3)} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_k H_l C_{L\lambda\rho}{}^{\nu\mu} \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} (D_\nu l_{Lrj}) \right) \right| \mathcal{C}_{f_2 f_3}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_l C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_k) \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} l_{Lrj} \right) \right| \mathcal{C}_{f_2 f_3}^{[2]} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_l C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_k) \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} l_{Lrj} \right) \right| \mathcal{C}_{f_2 f_3}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \left| \right. \quad (4.61)$$

Class $C_L \psi^4 \phi$: 4 types

$$\mathcal{O}_{C_L \bar{e}_R l^3 H} \left| \mathcal{Y} \left[\begin{smallmatrix} r & s \\ l & s \end{smallmatrix} \right] \epsilon^{ij} \epsilon^{kl} H_l C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} l_{Lri} \right) (l_{Lsj} C \sigma^{\mu\nu} l_{Ltk}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \left| \right. \quad (4.62)$$

$$\mathcal{O}_{C_L \bar{d}_R^3 l H^\dagger} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r & s \\ p & r & s \end{smallmatrix} \right] \epsilon_{abc} H^{\dagger i} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rs}^c \sigma^{\mu\nu} l_{Lti} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[3]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_5} \epsilon_{a_2 a_3 a_4} \left| \right. \quad (4.63)$$

$$\mathcal{O}_{C_L \bar{d}_R^2 l \bar{u}_R H} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon_{abc} \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rt}^c \sigma^{\mu\nu} l_{Lsi} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{i_4 i_6} \epsilon_{a_2 a_3 a_5} \left| \right. \quad (4.64)$$

$$\mathcal{O}_{C_L \bar{d}_R l^2 q H}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} r & s \\ r & s \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_l C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} l_{Lri} \right) (l_{Lsj} C \sigma^{\mu\nu} q_{Ltak}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} r & s \\ r & s \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_l C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} l_{Lri} \right) (l_{Lsj} C \sigma^{\mu\nu} q_{Ltak}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \left| \right. \quad (4.65)$$

Class $C_L F_L \psi^2 \phi^2$: 2 types

$$\mathcal{O}_{C_L B_L l^2 H^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ p \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_k H_l B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} (l_{Lpi} C \sigma^{\mu\nu} l_{Lrj}) \right| \mathcal{C}_{f_3 f_4}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \left| \right. \quad (4.66)$$

$$\mathcal{O}_{C_L W_L l^2 H^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \tau_m^{Ij} \epsilon^{il} \epsilon^{km} H_k H_l C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (l_{Lpi} C \sigma^{\mu\nu} l_{Lrj}) \right| \mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_5 m} \epsilon^{i_3 i_6} \left(\tau_m^{I_2} \right)_{\text{m}}^{i_4} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ p \end{smallmatrix} \right] \tau_m^{Ij} \epsilon^{il} \epsilon^{km} H_k H_l C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (l_{Lpi} C \sigma^{\mu\nu} l_{Lrj}) \right| \mathcal{C}_{f_3 f_4}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_5 m} \epsilon^{i_3 i_6} \left(\tau_m^{I_2} \right)_{\text{m}}^{i_4} \left| \right. \quad (4.67)$$

Class $C_L^2 \psi^2 \phi^2$: 1 types

$$\mathcal{O}_{C_L^2 l^2 H^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon^{ik} \epsilon^{jl} H_k H_l C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} l_{Lpi} C l_{Lrj} \right| \mathcal{C}_{f_3 f_4} \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \left| \right. \quad (4.68)$$

Class $C_L^2 \bar{\psi}^2 \phi^2$: 1 types

$$\mathcal{O}_{C_L^2 \bar{l}^2 H^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] \epsilon_{ik} \epsilon_{jl} H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \bar{l}_{Lp}^k C \bar{l}_{Lr}^l \right| \mathcal{C}_{f_5 f_6}^{[2]} [56] \langle 12 \rangle^4 \epsilon_{i_3 i_5} \epsilon_{i_4 i_6} \left| \right. \quad (4.69)$$

4.5 Dim-10 operator and amplitude bases

Class $C_L F_L^3 D^2$: 4 types

$$\mathcal{O}_{C_L B_L W_L^2 D^2} \left| W_L^{I\lambda\rho} W_L^{I\xi\nu} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu B_{L\xi}^\eta) \right| s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{I_3 I_4} \quad (4.70)$$

$$\mathcal{O}_{C_L W_L^3 D^2} \left| \epsilon^{IJK} W_L^{K\xi\nu} W_L^{J\xi\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu W_L^{I\rho\eta}) \right| s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \epsilon^{I_2 I_3 I_4} \quad (4.71)$$

$$\mathcal{O}_{C_L B_L G_L^2 D^2} \left| G_L^{A\lambda\rho} G_L^{A\xi\nu} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu B_{L\xi}^\eta) \right| s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{A_3 A_4} \quad (4.72)$$

$$\mathcal{O}_{C_L G_L^3 D^2} \left| f^{ABC} G_L^{C\xi\nu} G_L^{B\xi\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu G_L^{A\rho\eta}) \right| s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle f^{A_2 A_3 A_4} \quad (4.73)$$

Class $C_L^2 F_L^2 D^2$: 3 types

$$\mathcal{O}_{C_L^2 B_L^2 D^2} \left| \begin{array}{l} B_{L\xi\tau} B_L^{\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ B_L^{\nu\lambda} B_L^{\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \end{array} \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^2 \quad (4.74)$$

$$\mathcal{O}_{C_L^2 W_L^2 D^2} \left| \begin{array}{l} W_{L\xi\tau}^I W_L^{I\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ W_L^{\nu\lambda} W_L^{I\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \end{array} \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{I_3 I_4} \quad (4.75)$$

$$\mathcal{O}_{C_L^2 G_L^2 D^2} \left| \begin{array}{l} G_{L\xi\tau}^A G_L^{A\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ G_L^{A\nu\lambda} G_L^{A\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \end{array} \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{A_3 A_4} \quad (4.76)$$

Class $C_L^3 F_L D^2$: 1 types

$$\mathcal{O}_{C_L^3 B_L D^2} \left| B_L^{\nu\xi} C_{Lv}^{\tau\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \right| s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \langle 34 \rangle \quad (4.77)$$

Class $C_L^4 D^2$: 1 types

$$\mathcal{O}_{C_L^4 D^2} \left| C_{L\xi\tau\nu\varphi} C_L^{\xi\tau\nu\varphi} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^4 \quad (4.78)$$

Class $C_L F_L^2 F_R D^2$: 4 types

$$\mathcal{O}_{C_L B_L W_L W_R D^2} \left| W_R^{I\xi\lambda} W_L^{I\xi\eta} (D_\nu B_L^{\rho\mu}) (D_\mu C_{L\lambda\rho\eta}^\nu) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle \delta^{I_3 I_4} \quad (4.79)$$

$$\mathcal{O}_{C_L W_L^2 W_R D^2} \left| \epsilon^{IJK} W_R^{K\xi\lambda} W_L^{J\xi\eta} (D_\mu C_{L\lambda\rho\eta}^\nu) (D_\nu W_L^{I\rho\mu}) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle \epsilon^{I_2 I_3 I_4} \quad (4.80)$$

$$\mathcal{O}_{C_L B_L G_L G_R D^2} \left| G_R^{A\xi\lambda} G_L^{A\xi\eta} (D_\nu B_L^{\rho\mu}) (D_\mu C_{L\lambda\rho\eta}^\nu) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle \delta^{A_3 A_4} \quad (4.81)$$

$$\mathcal{O}_{C_L G_L^2 G_R D^2} \left| f^{ABC} G_R^{C\xi\lambda} G_L^{B\xi\eta} (D_\nu G_L^{A\rho\mu}) (D_\mu C_{L\lambda\rho\eta}^\nu) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle f^{A_2 A_3 A_4} \quad (4.82)$$

Class $C_L^2 F_L F_R D^2$: 3 types

$$\mathcal{O}_{C_L^2 B_L B_R D^2} \left| B_R^{\tau\lambda} C_L^{\rho\nu\xi\mu} B_{L\tau}^\eta (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \right| [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (4.83)$$

$$\mathcal{O}_{C_L^2 W_L W_R D^2} \left| C_L^{\rho\nu\xi\mu} W_R^{I\tau\lambda} W_{L\tau}^I (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \right| [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{I_3 I_4} \quad (4.84)$$

$$\mathcal{O}_{C_L^2 G_L G_R D^2} \left| C_L^{\rho\nu\xi\mu} G_R^{A\tau\lambda} G_{L\tau}^A (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \right| [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{A_3 A_4} \quad (4.85)$$

Class $C_L F_L \psi\bar{\psi} D^3$: 10 types

$$\mathcal{O}_{C_L B_L \bar{e}_R e_R D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}^\nu) (\bar{e}_{Rp} \gamma^\eta e_{Rr}) (D_\nu D^\mu B_L^{\lambda\rho}) \\ (D_\nu B_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) ((D^\mu \bar{e}_{Rp}) \gamma^\eta e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \\ \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \end{array} \quad (4.86)$$

$$\mathcal{O}_{C_L B_L \bar{l} D^3}^{(1,2)} \left| \frac{(D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{l}_{Lr}^i \gamma^\eta l_{Lpi} \right) \left((D_\nu D^\mu B_L^{\lambda\rho}) \right)}{(D_\nu B_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{l}_{Lr}^i \gamma^\eta (D^\mu l_{Lpi}) \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{i_4}^{i_3}} \quad (4.87)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R D^3}^{(1,2)} \left| \frac{(D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{d}_{Rp}^a \gamma^\eta d_{Rra} \right) (D_\nu D^\mu B_L^{\lambda\rho})}{(D_\nu B_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left((D^\mu \bar{d}_{Rp}^a) \gamma^\eta d_{Rra} \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_3}^{a_4}} \quad (4.88)$$

$$\mathcal{O}_{C_L B_L \bar{u}_R u_R D^3}^{(1,2)} \left| \frac{(D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{u}_{Rp}^a \gamma^\eta u_{Rra} \right) (D_\nu D^\mu B_L^{\lambda\rho})}{(D_\nu B_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left((D^\mu \bar{u}_{Rp}^a) \gamma^\eta u_{Rra} \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_3}^{a_4}} \quad (4.89)$$

$$\mathcal{O}_{C_L B_L \bar{q} \bar{q} D^3}^{(1,2)} \left| \frac{(D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{q}_{Lr}^{ai} \gamma^\eta q_{Lpai} \right) \left((D_\nu D^\mu B_L^{\lambda\rho}) \right)}{(D_\nu B_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{q}_{Lr}^{ai} \gamma^\eta (D^\mu q_{Lpai}) \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_4}^{a_3}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{i_4}^{i_3} \delta_{a_4}^{a_3}} \quad (4.90)$$

$$\mathcal{O}_{C_L W_L \bar{l} D^3}^{(1,2)} \left| \frac{\tau_j^{Ii} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{l}_{Lr}^j \gamma^\eta l_{Lpi} \right) (D_\nu D^\mu W_L^{I\lambda\rho})}{\tau_j^{Ii} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(D_\nu W_L^{I\lambda\rho} \right) \left(\bar{l}_{Lr}^j \gamma^\eta (D^\mu l_{Lpi}) \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I_2})_{i_4}^{i_3}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\tau^{I_2})_{i_4}^{i_3}} \quad (4.91)$$

$$\mathcal{O}_{C_L W_L \bar{q} \bar{q} D^3}^{(1,2)} \left| \frac{\tau_j^{Ii} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{q}_{Lr}^{aj} \gamma^\eta q_{Lpai} \right) (D_\nu D^\mu W_L^{I\lambda\rho})}{\tau_j^{Ii} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(D_\nu W_L^{I\lambda\rho} \right) \left(\bar{q}_{Lr}^{aj} \gamma^\eta (D^\mu q_{Lpai}) \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} (\tau^{I_2})_{i_4}^{i_3}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_4}^{a_3} (\tau^{I_2})_{i_4}^{i_3}} \quad (4.92)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_R D^3}^{(1,2)} \left| \frac{\lambda_a^{Ab} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{d}_{Rp}^a \gamma^\eta d_{Rrb} \right) (D_\nu D^\mu G_L^{A\lambda\rho})}{\lambda_a^{Ab} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left((D^\mu \bar{d}_{Rp}^a) \gamma^\eta d_{Rrb} \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4}} \quad (4.93)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_R D^3}^{(1,2)} \left| \frac{\lambda_a^{Ab} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{u}_{Rp}^a \gamma^\eta u_{Rrb} \right) (D_\nu D^\mu G_L^{A\lambda\rho})}{\lambda_a^{Ab} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left((D^\mu \bar{u}_{Rp}^a) \gamma^\eta u_{Rrb} \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4}} \quad (4.94)$$

$$\mathcal{O}_{C_L G_L \bar{q} \bar{q} D^3}^{(1,2)} \left| \frac{\lambda_b^{Aa} (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{q}_{Lr}^{bi} \gamma^\eta q_{Lpai} \right) (D_\nu D^\mu G_L^{A\lambda\rho})}{\lambda_b^{Aa} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) \left(\bar{q}_{Lr}^{bi} \gamma^\eta (D^\mu q_{Lpai}) \right)} \right| \frac{\mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} (\lambda^{A_2})_{a_4}^{a_3}}{\mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{i_4}^{i_3} (\lambda^{A_2})_{a_4}^{a_3}} \quad (4.95)$$

Class $C_L^2 \psi \bar{\psi} D^3$: 5 types

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \left((D^\mu \bar{e}_{Rp}) \gamma^\nu e_{Rr} \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \quad (4.96)$$

$$\mathcal{O}_{C_L^2 \bar{l} D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \left(\bar{l}_{Lr}^i \gamma^\nu (D^\mu l_{Lpi}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{i_4}^{i_3} \quad (4.97)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \left((D^\mu \bar{d}_{Rp}^a) \gamma^\nu d_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_3}^{a_4} \quad (4.98)$$

$$\mathcal{O}_{C_L^2 \bar{u}_R u_R D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) \left((D^\mu \bar{u}_{Rp}^a) \gamma^\nu u_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_3}^{a_4} \quad (4.99)$$

$$\mathcal{O}_{C_L^2 q \bar{q} D^3} \left| C_L^{\lambda \rho \eta \xi} (D_\mu D_\nu C_{L \lambda \rho \eta \xi}) (\bar{q}_{Lr}^{ai} \gamma^\nu (D^\mu q_{Lpai})) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \left| \quad (4.100) \right.$$

Class $C_L \psi^2 \phi D^4$: 3 types

$$\mathcal{O}_{C_L \bar{e}_R l H^\dagger D^4}^{(1,2)} \left| \begin{array}{l} H^{\dagger i} C_L^{\rho \nu \lambda \mu} ((D_\mu D_\nu \bar{e}_{Rp}) (D_\lambda D_\rho l_{Lri})) \\ H^{\dagger i} (D_\mu C_{L \rho \eta}^{\lambda \nu}) ((D_\nu D^\mu \bar{e}_{Rp}) \sigma^{\rho \eta} (D_\lambda l_{Lri})) \end{array} \right| \mathcal{C}_{f_2, f_3} [34] s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \left| \quad (4.101) \right.$$

$$\mathcal{O}_{C_L \bar{d}_R q H^\dagger D^4}^{(1,2)} \left| \begin{array}{l} H^{\dagger i} C_L^{\rho \nu \lambda \mu} ((D_\mu D_\nu \bar{d}_{Rp}^a) (D_\lambda D_\rho q_{Lrai})) \\ H^{\dagger i} (D_\mu C_{L \rho \eta}^{\lambda \nu}) ((D_\nu D^\mu \bar{d}_{Rp}^a) \sigma^{\rho \eta} (D_\lambda q_{Lrai})) \end{array} \right| \mathcal{C}_{f_2, f_3} [34] s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \left| \quad (4.102) \right.$$

$$\mathcal{O}_{C_L \bar{u}_R H D^4}^{(1,2)} \left| \begin{array}{l} \epsilon^{ij} H_j C_L^{\rho \nu \lambda \mu} ((D_\lambda D_\rho \bar{u}_{Rr}^a) (D_\mu D_\nu q_{Lpai})) \\ \epsilon^{ij} H_j (D_\mu C_{L \rho \eta}^{\lambda \nu}) ((D_\lambda \bar{u}_{Rr}^a) \sigma^{\rho \eta} (D_\nu D^\mu q_{Lpai})) \end{array} \right| \mathcal{C}_{f_2, f_3} [34] s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{a_2} \epsilon^{i_2 i_4} \left| \quad (4.103) \right.$$

Class $C_L F_L \phi^2 D^4$: 2 types

$$\mathcal{O}_{C_L B_L H H^\dagger D^4}^{(1,2)} \left| \begin{array}{l} H^{\dagger i} (D_\lambda H_i) (D_\mu C_{L \rho \eta}^{\lambda \nu}) (D_\nu D^\mu B_L^{\rho \eta}) \\ H^{\dagger i} (D_\nu B_L^{\rho \eta}) (D_\mu C_{L \rho \eta}^{\lambda \nu}) (D_\lambda D^\mu H_i) \end{array} \right| [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \left| \quad (4.104) \right.$$

$$\mathcal{O}_{C_L W_L H H^\dagger D^4}^{(1,2)} \left| \begin{array}{l} \tau^{Ii} H^{\dagger j} (D_\lambda H_i) (D_\mu C_{L \rho \eta}^{\lambda \nu}) (D_\nu D^\mu W_L^{I \rho \eta}) \\ \tau^{Ii} H^{\dagger j} (D_\mu C_{L \rho \eta}^{\lambda \nu}) (D_\nu W_L^{I \rho \eta}) (D_\lambda D^\mu H_i) \end{array} \right| [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I_2})_{i_4}^{i_3} \left| \quad (4.105) \right.$$

Class $C_L^2 \phi^2 D^4$: 1 types

$$\mathcal{O}_{C_L^2 H H^\dagger D^4}^{(1,2)} \left| \begin{array}{l} H_i H^{\dagger i} (D_\mu D_\nu C_{L \lambda \rho \eta \xi}) (D^\mu D^\nu C_L^{\lambda \rho \eta \xi}) \\ H^{\dagger i} C_L^{\lambda \rho \eta \xi} (D_\mu D_\nu C_{L \lambda \rho \eta \xi}) (D^\mu D^\nu H_i) \end{array} \right| s_{34}^2 \langle 12 \rangle^4 \delta_{i_4}^{i_3} \left| \quad (4.106) \right.$$

Class $C_R^2 F_L^2 D^2$: 3 types

$$\mathcal{O}_{C_R^2 B_L^2 D^2} \left| C_{R \rho \eta \xi \tau} C_R^{\rho \eta \xi \tau} (D_\mu B_{L \nu \lambda}) (D^\mu B_L^{\nu \lambda}) \right| [34]^4 s_{34} \langle 12 \rangle^2 \left| \quad (4.107) \right.$$

$$\mathcal{O}_{C_R^2 W_L^2 D^2} \left| C_{R \rho \eta \xi \tau} C_R^{\rho \eta \xi \tau} (D_\mu W_{L \nu \lambda}^I) (D^\mu W_L^{I \nu \lambda}) \right| [34]^4 s_{34} \langle 12 \rangle^2 \delta^{I_1 I_2} \left| \quad (4.108) \right.$$

$$\mathcal{O}_{C_R^2 G_L^2 D^2} \left| C_{R \rho \eta \xi \tau} C_R^{\rho \eta \xi \tau} (D_\mu G_{L \nu \lambda}^A) (D^\mu G_L^{A \nu \lambda}) \right| [34]^4 s_{34} \langle 12 \rangle^2 \delta^{A_1 A_2} \left| \quad (4.109) \right.$$

Class $C_R F_L^2 F_R D^2$: 4 types

$$\mathcal{O}_{C_R B_L W_L W_R D^2} \left| C_R^{\eta \xi \rho \lambda} W_{R \eta \xi}^I (D_\mu B_{L \lambda}^\nu) (D_\nu W_{L \rho}^\mu) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle \delta^{I_2 I_3} \left| \quad (4.110) \right.$$

$$\mathcal{O}_{C_R W_L^2 W_R D^2} \left| \epsilon^{IJK} C_R^{\eta \xi \rho \lambda} W_{R \eta \xi}^K (D_\mu W_{L \lambda}^\nu) (D_\nu W_{L \rho}^\mu) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle \epsilon^{I_1 I_2 I_3} \left| \quad (4.111) \right.$$

$$\mathcal{O}_{C_R B_L G_L G_R D^2} \left| C_R^{\eta \xi \rho \lambda} G_{R \eta \xi}^A (D_\mu B_{L \lambda}^\nu) (D_\nu G_{L \rho}^\mu) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle \delta^{A_2 A_3} \left| \quad (4.112) \right.$$

$$\mathcal{O}_{C_R G_L^2 G_R D^2} \left| f^{ABC} C_R^{\eta \xi \rho \lambda} G_{R \eta \xi}^C (D_\mu G_{L \lambda}^\nu) (D_\nu G_{L \rho}^\mu) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle f^{A_1 A_2 A_3} \left| \quad (4.113) \right.$$

Class $C_L C_R F_L F_R D^2$: 3 types

$$\mathcal{O}_{C_L C_R B_L B_R D^2} \left| B_{R\xi\tau} C_R^{\xi\tau\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu B_{L\eta}{}^\rho) \right| [34]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (4.114)$$

$$\mathcal{O}_{C_L C_R W_L W_R D^2} \left| C_R^{\xi\tau\eta\lambda} W_{R\xi\tau}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu W_{L\eta}^I{}^\rho) \right| [34]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} \quad (4.115)$$

$$\mathcal{O}_{C_L C_R G_L G_R D^2} \left| C_R^{\xi\tau\eta\lambda} G_{R\xi\tau}^A C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu G_{L\eta}^A{}^\rho) \right| [34]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \quad (4.116)$$

Class $C_L^2 C_R^2 D^2$: 1 types

$$\mathcal{O}_{C_L^2 C_R^2 D^2} \left| C_{R\xi\tau\nu\varphi} C_R^{\xi\tau\nu\varphi} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \right| [34]^4 s_{34} \langle 12 \rangle^4 \quad (4.117)$$

Class $C_R F_L \psi \bar{\psi} D^3$: 10 types

$$\mathcal{O}_{C_R B_L \bar{e}_R e_R D^3} \left| C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu B_{L\rho}{}^\nu) ((D_\lambda D_\nu \bar{e}_{Rp}) \gamma^\eta e_{Rr}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \quad (4.118)$$

$$\mathcal{O}_{C_R B_L \bar{l} D^3} \left| C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu B_{L\rho}{}^\nu) (\bar{l}_{Lr}^i \gamma^\eta (D_\lambda D_\nu l_{Lpi})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{i_3}^{i_2} \quad (4.119)$$

$$\mathcal{O}_{C_R B_L \bar{d}_R d_R D^3} \left| C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu B_{L\rho}{}^\nu) ((D_\lambda D_\nu \bar{d}_{Rp}^a) \gamma^\eta d_{Rra}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_2}^{a_3} \quad (4.120)$$

$$\mathcal{O}_{C_R B_L \bar{u}_R u_R D^3} \left| C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu B_{L\rho}{}^\nu) ((D_\lambda D_\nu \bar{u}_{Rp}^a) \gamma^\eta u_{Rra}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_2}^{a_3} \quad (4.121)$$

$$\mathcal{O}_{C_R B_L q \bar{q} D^3} \left| C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu B_{L\rho}{}^\nu) (\bar{q}_{Lr}^{ai} \gamma^\eta (D_\lambda D_\nu q_{Lpai})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{i_3}^{i_2} \delta_{a_3}^{a_2} \quad (4.122)$$

$$\mathcal{O}_{C_R W_L \bar{l} D^3} \left| \tau_j^{Ii} C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu W_{L\rho}^I{}^\nu) (\bar{l}_{Lr}^j \gamma^\eta (D_\lambda D_\nu l_{Lpi})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle (\tau^{I_1})_{i_3}^{i_2} \quad (4.123)$$

$$\mathcal{O}_{C_R W_L q \bar{q} D^3} \left| \tau_j^{Ii} C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu W_{L\rho}^I{}^\nu) (\bar{q}_{Lr}^{aj} \gamma^\eta (D_\lambda D_\nu q_{Lpai})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_3}^{a_2} (\tau^{I_1})_{i_3}^{i_2} \quad (4.124)$$

$$\mathcal{O}_{C_R G_L \bar{l}_R d_R D^3} \left| \lambda_a^{Ab} C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu G_{L\rho}^A{}^\nu) ((D_\lambda D_\nu \bar{d}_{Rp}^a) \gamma^\eta d_{Rrb}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle (\lambda^{A_1})_{a_2}^{a_3} \quad (4.125)$$

$$\mathcal{O}_{C_R G_L \bar{u}_R u_R D^3} \left| \lambda_a^{Ab} C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu G_{L\rho}^A{}^\nu) ((D_\lambda D_\nu \bar{u}_{Rp}^a) \gamma^\eta u_{Rrb}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle (\lambda^{A_1})_{a_2}^{a_3} \quad (4.126)$$

$$\mathcal{O}_{C_R G_L q \bar{q} D^3} \left| \lambda_b^{Aa} C_{R\eta}^\rho{}^{\lambda\mu} (D_\mu G_{L\rho}^A{}^\nu) (\bar{q}_{Lr}^{bi} \gamma^\eta (D_\lambda D_\nu q_{Lpai})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{i_3}^{i_2} (\lambda^{A_1})_{a_3}^{a_2} \quad (4.127)$$

Class $C_L C_R \psi \bar{\psi} D^3$: 5 types

$$\mathcal{O}_{C_L C_R \bar{e}_R e_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}{}^\nu{}_\eta{}^\mu ((D_\lambda D_\mu D_\nu \bar{e}_{Rp}) \gamma^\xi e_{Rr}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \quad (4.128)$$

$$\mathcal{O}_{C_L C_R \bar{l} D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}{}^\nu{}_\eta{}^\mu (\bar{l}_{Lr}^i \gamma^\xi (D_\lambda D_\mu D_\nu l_{Lpi})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{i_3}^{i_2} \quad (4.129)$$

$$\mathcal{O}_{C_L C_R \bar{d}_R d_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}{}^\nu{}_\eta{}^\mu ((D_\lambda D_\mu D_\nu \bar{d}_{Rp}^a) \gamma^\xi d_{Rra}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \quad (4.130)$$

$$\mathcal{O}_{C_L C_R \bar{u}_R u_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}{}^\nu{}_\eta{}^\mu ((D_\lambda D_\mu D_\nu \bar{u}_{Rp}^a) \gamma^\xi u_{Rra}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \quad (4.131)$$

$$\mathcal{O}_{C_L C_R q \bar{q} D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}{}^\nu{}_\eta{}^\mu (\bar{q}_{Lr}^{ai} \gamma^\xi (D_\lambda D_\mu D_\nu q_{Lpai})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{i_3}^{i_2} \delta_{a_3}^{a_2} \quad (4.132)$$

Class $C_R \psi^2 \phi D^4$: 3 types

$$\mathcal{O}_{C_R \bar{e}_R l H^\dagger D^4} \left| H^{\dagger i} C_R^{\rho\nu\lambda\mu} ((D_\mu D_\nu \bar{e}_R)_p) (D_\lambda D_\rho l_{Ri}) \right| \mathcal{C}_{f_1, f_2} [24] [34]^3 \langle 13 \rangle \langle 23 \rangle^2 \delta_{i_3}^{i_2} \quad (4.133)$$

$$\mathcal{O}_{C_R \bar{d}_R q H^\dagger D^4} \left| H^{\dagger i} C_R^{\rho\nu\lambda\mu} ((D_\mu D_\nu \bar{d}_R)_p^a) (D_\lambda D_\rho q_{Lrai}) \right| \mathcal{C}_{f_1, f_2} [24] [34]^3 \langle 13 \rangle \langle 23 \rangle^2 \delta_{i_3}^{i_2} \delta_{a_1}^{a_2} \quad (4.134)$$

$$\mathcal{O}_{C_R q \bar{u}_R H D^4} \left| \epsilon^{ij} H_j C_R^{\rho\nu\lambda\mu} ((D_\lambda D_\rho \bar{u}_R)_r^a) (D_\mu D_\nu q_{Lpai}) \right| \mathcal{C}_{f_1, f_2} [24] [34]^3 \langle 13 \rangle \langle 23 \rangle^2 \delta_{a_2}^{a_1} \epsilon^{i_1 i_3} \quad (4.135)$$

Class $C_R F_L \phi^2 D^4$: 2 types

$$\mathcal{O}_{C_R B_L H H^\dagger D^4} \left| H^{\dagger i} C_R^{\eta\rho\lambda\mu} (D_\mu B_{L\eta}^\nu) (D_\lambda D_\nu D_\rho H_i) \right| [24] [34]^3 \langle 13 \rangle \langle 23 \rangle \delta_{i_3}^{i_2} \quad (4.136)$$

$$\mathcal{O}_{C_R W_L H H^\dagger D^4} \left| \tau_j^{Ii} H^{\dagger j} C_R^{\eta\rho\lambda\mu} (D_\mu W_{L\eta}^I{}^\nu) (D_\lambda D_\nu D_\rho H_i) \right| [24] [34]^3 \langle 13 \rangle \langle 23 \rangle (\tau^{I1})_{i_3}^{i_2} \quad (4.137)$$

Class $C_L C_R \phi^2 D^4$: 1 types

$$\mathcal{O}_{C_L C_R H H^\dagger D^4} \left| H^{\dagger i} C_R^{\rho\eta\lambda\xi} C_{L\eta}{}^\nu{}_\xi{}^\mu (D_\lambda D_\mu D_\nu D_\rho H_i) \right| [34]^4 \langle 13 \rangle^4 \delta_{i_3}^{i_2} \quad (4.138)$$

Class $C_L F_L^4$: 7 types

$$\mathcal{O}_{C_L B_L^4} \left| B_{L\eta\xi} B_L^{\eta\xi} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \quad (4.139)$$

$$\mathcal{O}_{C_L B_L^2 W_L^2}^{(1\sim 3)} \left| \begin{array}{l} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^{I\eta\xi} \\ B_{L\eta\xi} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^{I\mu\nu} \\ C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\nu\lambda} W_{L\eta\xi}^{I\xi\mu} B_{L\eta}{}^\rho B_{L\xi}{}^\eta \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \delta^{I_4 I_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 \delta^{I_4 I_5} \\ \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \langle 35 \rangle \delta^{I_4 I_5} \end{array} \quad (4.140)$$

$$\mathcal{O}_{C_L W_L^4}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^{I\lambda\rho} W_{L\eta\xi}^{J\eta\xi} W_{L\eta\xi}^{J\mu\nu} \\ C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\lambda\rho} W_{L\eta\xi}^{J\eta\xi} W_{L\eta\xi}^{I\mu} W_{L\eta\xi}^{J\nu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \delta^{I_2 I_4} \delta^{I_3 I_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 \delta^{I_2 I_4} \delta^{I_3 I_5} \end{array} \quad (4.141)$$

$$\mathcal{O}_{C_L B_L^2 G_L^2}^{(1\sim 3)} \left| \begin{array}{l} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^A G_{L\eta\xi}^{A\eta\xi} \\ B_{L\eta\xi} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^A G_{L\eta\xi}^{A\mu\nu} \\ C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\nu\lambda} G_{L\eta\xi}^{A\xi\mu} B_{L\eta}{}^\rho B_{L\xi}{}^\eta \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \langle 35 \rangle \delta^{A_4 A_5} \end{array} \quad (4.142)$$

$$\mathcal{O}_{C_L G_L^2 W_L^2}^{(1\sim 3)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\lambda\rho} G_{L\eta\xi}^{A\mu\nu} W_{L\eta\xi}^I W_{L\eta\xi}^{I\eta\xi} \\ C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^A G_{L\eta\xi}^{A\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^{I\mu\nu} \\ C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\nu\lambda} W_{L\eta\xi}^{I\xi\mu} G_{L\eta}^A G_{L\xi}^A \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \delta^{I_4 I_5} \delta^{A_2 A_3} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 \delta^{I_4 I_5} \delta^{A_2 A_3} \\ \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \langle 35 \rangle \delta^{I_4 I_5} \delta^{A_2 A_3} \end{array} \quad (4.143)$$

$$\mathcal{O}_{C_L B_L G_L^3}^{(1,2)} \left| \begin{array}{l} d^{ABC} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\mu\nu} G_{L\eta\xi}^{B\lambda\rho} G_{L\eta\xi}^C{}^\eta{}_\xi \\ d^{ABC} B_{L\eta\xi} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\lambda\rho} G_{L\eta\xi}^{B\mu\nu} G_{L\eta\xi}^C{}^\eta{}_\xi \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 d^{A_3 A_4 A_5} \\ \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle^2 d^{A_3 A_4 A_5} \end{array} \quad (4.144)$$

$$\mathcal{O}_{C_L G_L^4}^{(1\sim 3)} \left| \begin{array}{l} d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\lambda\rho} G_{L\eta\xi}^{B\mu\nu} G_{L\eta\xi}^C{}^\eta{}_\xi G_{L\eta\xi}^{D\eta\xi} \\ d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\lambda\rho} G_{L\eta\xi}^{B\mu\nu} G_{L\eta\xi}^C{}^\eta{}_\xi G_{L\eta\xi}^{D\eta\xi} \\ f^{ABE} f^{CDE} C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\lambda\rho} G_{L\eta\xi}^{B\mu\nu} G_{L\eta\xi}^C{}^\eta{}_\xi G_{L\eta\xi}^{D\eta\xi} \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 d^{E A_2 A_3} d^{E A_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 d^{E A_2 A_3} d^{E A_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 f^{E A_2 A_3} f^{E A_4 A_5} \end{array} \quad (4.145)$$

Class $C_L^2 F_L^3$: 4 types

$$\mathcal{O}_{C_L^2 B_L W_L^2} \left| C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\xi\mu} W_{L\eta\xi}^{I\tau\eta} B_{L\tau}{}^\nu C_{L\eta\xi}{}^{\lambda\rho} \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle^2 \delta^{I_4 I_5} \quad (4.146)$$

$$\mathcal{O}_{C_L^2 W_L^3} \left| \epsilon^{IJK} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\mu\nu\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^{K\tau\eta} W_{L\tau}^J{}^\xi \right| \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \langle 45 \rangle \epsilon^{I_3 I_4 I_5} \quad (4.147)$$

$$\mathcal{O}_{C_L^2 B_L G_L^2} \left| C_{L\mu\nu\lambda\rho} G_{L\eta\xi}^{A\xi\mu} G_{L\eta\xi}^{A\tau\eta} B_{L\tau}{}^\nu C_{L\eta\xi}{}^{\lambda\rho} \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle^2 \delta^{A_4 A_5} \quad (4.148)$$

$$\mathcal{O}_{C_L^2 G_L^3} \left| f^{ABC} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\mu\nu\lambda\rho} G_{L\eta\xi}^A G_{L\eta\xi}^{C\tau\eta} G_{L\tau}^B{}^\xi \right| \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \langle 45 \rangle f^{A_3 A_4 A_5} \quad (4.149)$$

Class $C_L^3 F_L^2$: 3 types

$$\mathcal{O}_{C_L^3 B_L^2}^{(1,2)} \left| \begin{array}{l} B_{L\tau\nu} B_L^{\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \\ B_L^{\eta\xi} B_L^{\tau\nu} C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \end{array} \right| \begin{array}{l} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \\ \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2 \end{array} \quad (4.150)$$

$$\mathcal{O}_{C_L^3 W_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} W_L^{I\tau\nu} W_L^{I\tau\nu} C_{L\eta\xi}^{\lambda\rho} \\ C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_L^{I\eta\xi} W_L^{I\tau\nu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \delta^{I_4 I_5} \\ \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2 \delta^{I_4 I_5} \end{array} \quad (4.151)$$

$$\mathcal{O}_{C_L^3 G_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} G_L^{A\tau\nu} G_L^{A\tau\nu} C_{L\eta\xi}^{\lambda\rho} \\ C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\tau\nu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2 \delta^{A_4 A_5} \end{array} \quad (4.152)$$

Class C_L^5 : 1 types

$$\mathcal{O}_{C_L^5} \left| C_{L\mu\nu\lambda\rho} C_{L\tau\nu\varphi\chi} C_L^{\mu\nu\eta\xi} C_L^{\tau\nu\varphi\chi} C_{L\eta\xi}^{\lambda\rho} \right| \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2 \quad (4.153)$$

Class $C_L F_L^2 \psi \bar{\psi} D$: 21 types

$$\mathcal{O}_{C_L B_L^2 \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} B_L^{\nu\lambda} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_R p \gamma^\mu e_{Rr}) \\ B_L^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{e}_R p \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \end{array} \quad (4.154)$$

$$\mathcal{O}_{C_L B_L^2 \bar{l} D}^{(1,2)} \left| \begin{array}{l} B_L^{\nu\lambda} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{l}_{Lr}^i \gamma^\mu l_{Lpi}) \\ B_L^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \end{array} \quad (4.155)$$

$$\mathcal{O}_{C_L B_L^2 \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} B_L^{\nu\lambda} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rra}) \\ B_L^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \end{array} \quad (4.156)$$

$$\mathcal{O}_{C_L B_L^2 \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} B_L^{\nu\lambda} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rra}) \\ B_L^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \end{array} \quad (4.157)$$

$$\mathcal{O}_{C_L B_L^2 q \bar{q} D}^{(1,2)} \left| \begin{array}{l} B_L^{\nu\lambda} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{ai} \gamma^\mu q_{Lpai}) \\ B_L^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \end{array} \quad (4.158)$$

$$\mathcal{O}_{C_L B_L W_L \bar{l} D}^{(1\sim 4)} \left| \begin{array}{l} \tau_j^{Ii} B_L^{\rho\eta} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{l}_{Lr}^j \gamma^\mu l_{Lpi}) \\ \tau_j^{Ii} W_L^{I\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ \tau_j^{Ii} C_{L\nu\lambda\rho\eta} W_L^{I\nu\lambda} (D_\mu B_L^{\rho\eta}) (\bar{l}_{Lr}^j \gamma^\mu l_{Lpi}) \\ \tau_j^{Ii} B_{L\eta}^\lambda C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\eta\nu}) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\tau^{I_3})_{i_5}^{i_4} \end{array} \quad (4.159)$$

$$\mathcal{O}_{C_L B_L W_L q \bar{q} D}^{(1\sim 4)} \left| \begin{array}{l} \tau_j^{Ii} B_L^{\rho\eta} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{aj} \gamma^\mu q_{Lpai}) \\ \tau_j^{Ii} W_L^{I\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\lambda) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ \tau_j^{Ii} C_{L\nu\lambda\rho\eta} W_L^{I\nu\lambda} (D_\mu B_L^{\rho\eta}) (\bar{q}_{Lr}^{aj} \gamma^\mu q_{Lpai}) \\ \tau_j^{Ii} B_{L\eta}^\lambda C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\eta\nu}) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \end{array} \quad (4.160)$$

$$\mathcal{O}_{C_L W_L^2 \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ W_L^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta^{I_2 I_3} \end{array} \quad (4.161)$$

$$\mathcal{O}_{C_L W_L^2 \bar{l} l D}^{(1\sim 4)} \left| \begin{array}{l} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{l}_{Lr}^i \gamma^\mu l_{Lpi}) \\ W_L^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \\ \tau_j^{Ki} \epsilon^{IJK} W_L^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ \tau_j^{Ki} \epsilon^{IJK} C_{L\nu\lambda\rho\eta} W_L^{J\nu\lambda} (D_\mu W_L^{I\rho\eta}) (\bar{l}_{Lr}^j \gamma^\mu l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \end{array} \quad (4.162)$$

$$\mathcal{O}_{C_L W_L^2 \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rra}) \\ W_L^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{I_2 I_3} \end{array} \quad (4.163)$$

$$\mathcal{O}_{C_L W_L^2 \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rra}) \\ W_L^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{I_2 I_3} \end{array} \quad (4.164)$$

$$\mathcal{O}_{C_L W_L^2 q \bar{q} D}^{(1\sim 4)} \left| \begin{array}{l} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{ai} \gamma^\mu q_{Lpai}) \\ W_L^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \\ \tau_j^{Ki} \epsilon^{IJK} W_L^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}^\lambda) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ \tau_j^{Ki} \epsilon^{IJK} C_{L\nu\lambda\rho\eta} W_L^{J\nu\lambda} (D_\mu W_L^{I\rho\eta}) (\bar{q}_{Lr}^{aj} \gamma^\mu q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_5}^{a_4} \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_5}^{a_4} \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \end{array} \quad (4.165)$$

$$\mathcal{O}_{C_L B_L G_L \bar{d}_R d_R D}^{(1\sim 4)} \left| \begin{array}{l} \lambda_a^{Ab} B_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rrb}) \\ \lambda_a^{Ab} G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu B_L^{\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rrb}) \\ \lambda_a^{Ab} B_{L\eta}{}^\lambda C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^{A\eta\nu}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \end{array} \quad (4.166)$$

$$\mathcal{O}_{C_L B_L G_L \bar{u}_R u_R D}^{(1\sim 4)} \left| \begin{array}{l} \lambda_a^{Ab} B_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ \lambda_a^{Ab} G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu B_L^{\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ \lambda_a^{Ab} B_{L\eta}{}^\lambda C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^{A\eta\nu}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \end{array} \quad (4.167)$$

$$\mathcal{O}_{C_L B_L G_L q \bar{q} D}^{(1\sim 4)} \left| \begin{array}{l} \lambda_b^{Aa} B_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{bi} \gamma^\mu q_{Lpai}) \\ \lambda_b^{Aa} G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\lambda) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \\ \lambda_b^{Aa} C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu B_L^{\rho\eta}) (\bar{q}_{Lr}^{bi} \gamma^\mu q_{Lpai}) \\ \lambda_b^{Aa} B_{L\eta}{}^\lambda C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^{A\eta\nu}) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{i_5}^{i_4} (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{i_5}^{i_4} (\lambda^{A_3})_{a_5}^{a_4} \end{array} \quad (4.168)$$

$$\mathcal{O}_{C_L G_L W_L q \bar{q} D}^{(1 \sim 4)} \left| \begin{array}{l} \lambda^A a_b \tau^{Ii} G_L^{A\rho\eta} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{bj} \gamma^\mu q_{Lpai}) \\ \lambda^A a_b \tau^{Ii} G_L^{A\rho\eta} W_L^{I\nu\lambda} (D_\mu G_L^A \eta^\lambda) (\bar{q}_{Lr}^{bj} \gamma^\mu q_{Lpai}) \\ \lambda^A a_b \tau^{Ii} C_{L\nu\lambda\rho\eta} W_L^{I\nu\lambda} (D_\mu G_L^{A\rho\eta}) (\bar{q}_{Lr}^{bj} \gamma^\mu q_{Lpai}) \\ \lambda^A a_b \tau^{Ii} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\lambda (D_\mu W_L^{I\rho\eta}) (\bar{q}_{Lr}^{bj} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\lambda^{A_2})_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\lambda^{A_2})_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_2})_{a_5}^{a_4} (\tau^{I_3})_{i_5}^{i_4} \end{array} \quad (4.169)$$

$$\mathcal{O}_{C_L G_L^2 \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ G_L^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta^{A_2 A_3} \end{array} \quad (4.170)$$

$$\mathcal{O}_{C_L G_L^2 \bar{l} l D}^{(1,2)} \left| \begin{array}{l} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{l}_{Lr}^i \gamma^\mu l_{Lpi}) \\ G_L^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \delta^{A_2 A_3} \end{array} \quad (4.171)$$

$$\mathcal{O}_{C_L G_L^2 \bar{d}_R d_R D}^{(1 \sim 6)} \left| \begin{array}{l} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rra}) \\ G_L^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \\ d^{ABC} \lambda^C a_b G_L^{A\rho\eta} G_L^{B\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rrb}) \\ d^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \\ f^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \\ f^{ABC} \lambda^C a_b C_{L\nu\lambda\rho\eta} G_L^{B\nu\lambda} (D_\mu G_L^{A\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \end{array} \quad (4.172)$$

$$\mathcal{O}_{C_L G_L^2 \bar{u}_R u_R D}^{(1 \sim 6)} \left| \begin{array}{l} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rra}) \\ G_L^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \\ d^{ABC} \lambda^C a_b G_L^{A\rho\eta} G_L^{B\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ d^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \\ f^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \\ f^{ABC} \lambda^C a_b C_{L\nu\lambda\rho\eta} G_L^{B\nu\lambda} (D_\mu G_L^{A\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \end{array} \quad (4.173)$$

$$\mathcal{O}_{C_L G_L^2 q \bar{q} D}^{(1 \sim 6)} \left| \begin{array}{l} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{ai} \gamma^\mu q_{Lpai}) \\ G_L^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \\ d^{ABC} \lambda^C a_b G_L^{A\rho\eta} G_L^{B\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{bi} \gamma^\mu q_{Lpai}) \\ d^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \\ f^{ABC} \lambda^C a_b G_L^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^A \eta^\lambda) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \\ f^{ABC} \lambda^C a_b C_{L\nu\lambda\rho\eta} G_L^{B\nu\lambda} (D_\mu G_L^{A\rho\eta}) (\bar{q}_{Lr}^{bi} \gamma^\mu q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_5}^{a_4} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} d^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{i_5}^{i_4} f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{i_5}^{i_4} f^{CA_2 A_3} (\lambda^C)_{a_5}^{a_4} \end{array} \quad (4.174)$$

Class $C_L^2 F_L \psi \bar{\psi} D$: 10 types

$$\mathcal{O}_{C_L^2 B_L \bar{e}_R e_R D}^{(1 \sim 3)} \left| \begin{array}{l} B_L^{\xi\nu} C_L^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ B_L^{\nu\lambda} C_L^{\rho\eta} \xi^\mu (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\xi e_{Rr}) \\ C_L \eta_\xi^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu B_L^{\eta\xi}) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \end{array} \quad (4.175)$$

$$\begin{aligned}
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \quad t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} q_{Lsbk} C_{qLtcl} \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} (D_\nu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \quad t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\nu q_{Lsbk}) C_{qLtcl}) \left(l_{Lpi} C \sigma^{\lambda\rho} (D_\mu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \quad t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\mu l_{Lpi}) C (D_\nu q_{Lraj})) \left(q_{Lsbk} C \sigma^{\lambda\rho} q_{Ltcl} \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} q_{Lsbk} C_{qLtcl} \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} (D_\nu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\nu q_{Lsbk}) C_{qLtcl}) \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} q_{Lraj} \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\nu q_{Lsbk}) C_{qLtcl}) \left(l_{Lpi} C \sigma^{\lambda\rho} (D_\mu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\mu l_{Lpi}) C (D_\nu q_{Lraj})) \left(q_{Lsbk} C \sigma^{\lambda\rho} q_{Ltcl} \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ij} \epsilon^{kl} C_{L\lambda\rho}^{\nu\mu} q_{Lsbk} C_{qLtcl} \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} (D_\nu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \quad s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ij} \epsilon^{kl} C_{L\lambda\rho}^{\nu\mu} (l_{Lpi} C (D_\mu q_{Lraj})) \left((D_\nu q_{Lsbk}) C \sigma^{\lambda\rho} q_{Ltcl} \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \\ \hline s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} q_{Lsbk} C_{qLtcl} \left((D_\mu l_{Lpi}) C \sigma^{\lambda\rho} (D_\nu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \\ \hline s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\nu q_{Lsbk}) C_{qLtcl}) \left(l_{Lpi} C \sigma^{\lambda\rho} (D_\mu q_{Lraj}) \right) \\
 & \mathcal{Y} \left[\begin{array}{|c|} \hline r \\ \hline s \\ \hline t \\ \hline \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\lambda\rho}^{\nu\mu} ((D_\mu l_{Lpi}) C (D_\nu q_{Lraj})) \left(q_{Lsbk} C \sigma^{\lambda\rho} q_{Ltcl} \right) \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[3]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[3]} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[3]} [34] \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} s_{45} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} [45] \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \langle 35 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} [34] \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[2,1]} [35] \langle 13 \rangle^2 \langle 14 \rangle \langle 15 \rangle \langle 25 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[1,1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[1,1,1]} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 45 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5} \\
 & \mathcal{C}_{f_2, f_3 f_4 f_5}^{[1,1,1]} [34] \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle \epsilon^{i_2 i_4} \epsilon^{i_3 i_5} \epsilon^{a_3 a_4 a_5}
 \end{aligned} \tag{4.188}$$

Class $C_L F_L \psi^2 \phi D^2$: 8 types

$$\begin{aligned}
 & \mathcal{O}_{C_L B_L \bar{e}_R l H^\dagger D^2}^{(1 \sim 8)} \left\{ \begin{array}{l} H^\dagger i C_{L\lambda\rho}^{\nu\mu} \left(D_\mu B_L^{\lambda\rho} \right) ((D_\nu \bar{e}_R p) l_{Lri}) \\ H^\dagger i C_{L\lambda\rho}^{\nu\mu} \left(D_\mu B_L^{\lambda\rho} \right) (\bar{e}_R p (D_\nu l_{Lri})) \\ H^\dagger i B_L^{\lambda\rho} C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_R p) (D_\nu l_{Lri})) \\ H^\dagger i (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu B_L^{\rho\eta}) \left(\bar{e}_R p \sigma^{\nu\lambda} l_{Lri} \right) \\ H^\dagger i B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{e}_R p) \sigma^{\nu\lambda} l_{Lri} \right) \\ H^\dagger i C_{L\lambda\rho}^{\nu\mu} (D_\mu B_L^{\lambda\rho}) \left((D_\nu \bar{e}_R p) \sigma^{\eta\lambda} l_{Lri} \right) \\ H^\dagger i B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{e}_R p \sigma^{\nu\lambda} (D^\mu l_{Lri}) \right) \\ H^\dagger i B_L^{\rho\eta} C_{L\lambda\rho}^{\nu\mu} \left((D_\mu \bar{e}_R p) \sigma^{\eta\lambda} (D_\nu l_{Lri}) \right) \end{array} \right\} \left| \begin{array}{l} \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \delta_{i_5}^{i_4} \end{array} \right|
 \end{aligned} \tag{4.189}$$

$$\begin{array}{c} \mathcal{O}_{C_L W_L q \bar{u}_R H D^2}^{(1 \sim 8)} \end{array} \left| \begin{array}{l} \tau_k^{Ii} \epsilon^{jk} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_L^{I\lambda\rho} \right) \left(\bar{u}_{Rr}^a (D_\nu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_L^{I\lambda\rho} \right) \left((D_\nu \bar{u}_{Rr}^a) q_{Lpai} \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left((D_\nu \bar{u}_{Rr}^a) (D_\mu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu W_L^{I\rho\eta} \right) \left(\bar{u}_{Rr}^a \sigma^{\nu\lambda} q_{Lpai} \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j W_L^{I\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{u}_{Rr}^a \sigma^{\nu\lambda} (D^\mu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_{L\eta}^{I\rho} \right) \left(\bar{u}_{Rr}^a \sigma^{\eta\lambda} (D_\nu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j W_L^{I\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left((D^\mu \bar{u}_{Rr}^a) \sigma^{\nu\lambda} q_{Lpai} \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j C_{L\lambda\rho}{}^{\nu\mu} W_{L\eta}^{I\rho} \left((D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\lambda} (D_\mu q_{Lpai}) \right) \end{array} \left| \begin{array}{l} \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \delta_{a_4}^{a_3} \epsilon^{i_5 k} \left(\tau_{I_2}^{I_3} \right)_k^{i_3} \end{array} \right| \quad (4.194)$$

$$\begin{array}{c} \mathcal{O}_{C_L G_L \bar{d}_R q H^\dagger D^2}^{(1 \sim 8)} \end{array} \left| \begin{array}{l} \lambda_a^{Ab} H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left((D_\nu \bar{d}_{Rp}^a) q_{Lrbi} \right) \\ \lambda_a^{Ab} H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\bar{d}_{Rp}^a (D_\nu q_{Lrbi}) \right) \\ \lambda_a^{Ab} H^\dagger{}^i G_L^{A\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left((D_\mu \bar{d}_{Rp}^a) (D_\nu q_{Lrbi}) \right) \\ \lambda_a^{Ab} H^\dagger{}^i \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu G_L^{A\rho\eta} \right) \left(\bar{d}_{Rp}^a \sigma^{\nu\lambda} q_{Lrbi} \right) \\ \lambda_a^{Ab} H^\dagger{}^i G_L^{A\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left((D^\mu \bar{d}_{Rp}^a) \sigma^{\nu\lambda} q_{Lrbi} \right) \\ \lambda_a^{Ab} H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_{L\eta}^{A\rho} \right) \left((D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} q_{Lrbi} \right) \\ \lambda_a^{Ab} H^\dagger{}^i G_L^{A\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{d}_{Rp}^a \sigma^{\nu\lambda} (D^\mu q_{Lrbi}) \right) \\ \lambda_a^{Ab} H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} G_{L\eta}^{A\rho} \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} (D_\nu q_{Lrbi}) \right) \end{array} \left| \begin{array}{l} \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \delta_{i_5}^{i_4} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \end{array} \right| \quad (4.195)$$

$$\begin{array}{c} \mathcal{O}_{C_L G_L q \bar{u}_R H D^2}^{(1 \sim 8)} \end{array} \left| \begin{array}{l} \lambda_b^{Aa} \epsilon^{ij} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\bar{u}_{Rr}^b (D_\nu q_{Lpai}) \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left((D_\nu \bar{u}_{Rr}^b) q_{Lpai} \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j G_L^{A\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left((D_\nu \bar{u}_{Rr}^b) (D_\mu q_{Lpai}) \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu G_L^{A\rho\eta} \right) \left(\bar{u}_{Rr}^b \sigma^{\nu\lambda} q_{Lpai} \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j G_L^{A\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{u}_{Rr}^b \sigma^{\nu\lambda} (D^\mu q_{Lpai}) \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_{L\eta}^{A\rho} \right) \left(\bar{u}_{Rr}^b \sigma^{\eta\lambda} (D_\nu q_{Lpai}) \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j G_L^{A\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left((D^\mu \bar{u}_{Rr}^b) \sigma^{\nu\lambda} q_{Lpai} \right) \\ \lambda_b^{Aa} \epsilon^{ij} H_j C_{L\lambda\rho}{}^{\nu\mu} G_{L\eta}^{A\rho} \left((D_\nu \bar{u}_{Rr}^b) \sigma^{\eta\lambda} (D_\mu q_{Lpai}) \right) \end{array} \left| \begin{array}{l} \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \end{array} \right| \quad (4.196)$$

Class $C_L F_L^2 \phi^2 D^2$: 4 types

$$\begin{array}{c} \mathcal{O}_{C_L B_L^2 H H^\dagger D^2}^{(1 \sim 4)} \end{array} \left| \begin{array}{l} H_i H^\dagger{}^i B_L^{\nu\lambda} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu B_L^{\rho\eta} \right) \\ H_i H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu B_L^{\eta\lambda} \right) \left(D_\mu B_{L\eta}^\rho \right) \\ H^\dagger{}^i B_L^{\nu\lambda} B_L^{\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu H_i \right) \\ H^\dagger{}^i B_L^{\eta\lambda} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu B_{L\eta}^\rho \right) \end{array} \left| \begin{array}{l} s_{45} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \\ s_{35} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \\ s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_5}^{i_4} \end{array} \right| \quad (4.197)$$

$$\mathcal{O}_{C_L B_L W_L H H^\dagger D^2}^{(1\sim 7)} \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu B_L^{\rho\eta}) \\ \tau_j^{Ii} H_i H^{\dagger j} B_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu W_L^{I\nu\lambda}) \\ \tau_j^{Ii} H_i H^{\dagger j} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu B_{L\eta}{}^\rho) (D_\nu W_L^{I\eta\lambda}) \\ \tau_j^{Ii} H^{\dagger j} B_L^{\rho\eta} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ \tau_j^{Ii} H^{\dagger j} W_L^{I\eta\lambda} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu B_{L\eta}{}^\rho) \\ \tau_j^{Ii} H^{\dagger j} C_{L\nu\lambda\rho\eta} W_L^{I\nu\lambda} (D_\mu B_L^{\rho\eta}) (D^\mu H_i) \\ \tau_j^{Ii} H^{\dagger j} B_{L\eta}{}^\rho C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu W_L^{I\eta\lambda}) \end{array} \right| \begin{array}{l} s_{45} \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I_3})_{i_5}^{i_4} \\ s_{35} \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I_3})_{i_5}^{i_4} \\ s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I_3})_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 25 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [34] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle (\tau^{I_3})_{i_5}^{i_4} \end{array} \quad (4.198)$$

$$\mathcal{O}_{C_L W_L^2 H H^\dagger D^2}^{(1\sim 7)} \left| \begin{array}{l} H_i H^{\dagger i} W_L^{I\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu W_L^{I\rho\eta}) \\ H_i H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu W_{L\eta}{}^\rho) (D_\nu W_L^{I\eta\lambda}) \\ H^{\dagger i} W_L^{I\nu\lambda} W_L^{I\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ H^{\dagger i} W_L^{I\eta\lambda} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu W_{L\eta}{}^\rho) \\ \tau_j^{K i} \epsilon^{IJK} H_i H^{\dagger j} W_L^{J\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu W_L^{I\rho\eta}) \\ \tau_j^{K i} \epsilon^{IJK} H^{\dagger j} W_L^{J\eta\lambda} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu W_{L\eta}{}^\rho) \\ \tau_j^{K i} \epsilon^{IJK} H^{\dagger j} C_{L\nu\lambda\rho\eta} W_L^{J\nu\lambda} (D_\mu W_L^{I\rho\eta}) (D^\mu H_i) \end{array} \right| \begin{array}{l} s_{45} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ s_{35} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_5}^{i_4} \delta^{I_2 I_3} \\ s_{35} \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \\ s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{I_2 I_3 K} (\tau^K)_{i_5}^{i_4} \end{array} \quad (4.199)$$

$$\mathcal{O}_{C_L G_L^2 H H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} H_i H^{\dagger i} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu G_L^{A\rho\eta}) \\ H_i H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu G_{L\eta}{}^\rho) (D_\mu G_L^{A\eta\lambda}) \\ H^{\dagger i} G_L^{A\nu\lambda} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ H^{\dagger i} G_L^{A\eta\lambda} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu G_{L\eta}{}^\rho) \end{array} \right| \begin{array}{l} s_{45} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{A_2 A_3} \\ s_{35} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{A_2 A_3} \\ s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta^{A_2 A_3} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_5}^{i_4} \delta^{A_2 A_3} \end{array} \quad (4.200)$$

Class $C_L^2 \psi^2 \phi D^2$: 3 types

$$\mathcal{O}_{C_L^2 \bar{e}_R l H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Li}) H^{\dagger i} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) ((D^\mu \bar{e}_{Rp}) l_{Li}) \\ H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} (D^\mu l_{Li})) \\ H^{\dagger i} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) ((D^\mu \bar{e}_{Rp}) \sigma^{\xi\nu} l_{Li}) \\ H^{\dagger i} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \sigma^{\xi\nu} (D^\mu l_{Li})) \\ H^{\dagger i} C_{L\xi}^{\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) \sigma^{\eta\xi} (D_\nu l_{Li})) \end{array} \right| \begin{array}{l} C_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \\ C_{f_3, f_4} s_{35} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \\ C_{f_3, f_4} s_{45} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \\ C_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{i_5}^{i_4} \\ C_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \\ C_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \end{array} \quad (4.201)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R q H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} (\bar{d}_{Rp}^a q_{Lrai}) H^{\dagger i} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{d}_{Rp}^a) q_{Lrai} \right) \\ H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Rp}^a (D^\mu q_{Lrai}) \right) \\ H^{\dagger i} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{d}_{Rp}^a) \sigma^{\xi\nu} q_{Lrai} \right) \\ H^{\dagger i} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Rp}^a \sigma^{\xi\nu} (D^\mu q_{Lrai}) \right) \\ H^{\dagger i} C_{L\eta\xi}^{\lambda\rho} C_{L\lambda\rho}^{\nu\mu} \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\eta\xi} (D_\nu q_{Lrai}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_4} \end{array} \quad (4.202)$$

$$\mathcal{O}_{C_L^2 \bar{q} \bar{u}_R H D^2}^{(1\sim 6)} \left| \begin{array}{l} (\bar{u}_{Rr}^a q_{Lpai}) \epsilon^{ij} H_j (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ \epsilon^{ij} H_j C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rr}^a (D^\mu q_{Lpai})) \\ \epsilon^{ij} H_j C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) ((D^\mu \bar{u}_{Rr}^a) q_{Lpai}) \\ \epsilon^{ij} H_j C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rr}^a \sigma^{\xi\nu} (D^\mu q_{Lpai})) \\ \epsilon^{ij} H_j C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) ((D^\mu \bar{u}_{Rr}^a) \sigma^{\xi\nu} q_{Lpai}) \\ \epsilon^{ij} H_j C_{L\eta\xi}^{\lambda\rho} C_{L\lambda\rho}^{\nu\mu} ((D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\xi} (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \\ \mathcal{C}_{f_3, f_4} s_{35} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \\ \mathcal{C}_{f_3, f_4} s_{45} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \\ \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \\ \mathcal{C}_{f_3, f_4} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \\ \mathcal{C}_{f_3, f_4} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \end{array} \quad (4.203)$$

Class $C_L^2 F_L \phi^2 D^2$: 2 types

$$\mathcal{O}_{C_L^2 B_L H H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} H_i H^{\dagger i} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu B_L^{\xi\nu}) \\ H^{\dagger i} B_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ H^{\dagger i} B_L^{\lambda\rho} C_L^{\eta\xi\nu\mu} (D_\nu H_i) (D_\mu C_{L\lambda\rho\eta\xi}) \\ H^{\dagger i} C_{L\eta\xi}^{\lambda\rho} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_i) (D_\mu B_L^{\eta\xi}) \end{array} \right| \begin{array}{l} [45] \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{i_5}^{i_4} \\ [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \\ [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_5}^{i_4} \end{array} \quad (4.204)$$

$$\mathcal{O}_{C_L^2 W_L H H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu W_L^{I\xi\nu}) \\ \tau_j^{Ii} H^{\dagger j} W_L^{I\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ \tau_j^{Ii} H^{\dagger j} C_L^{\eta\xi\nu\mu} W_L^{I\lambda\rho} (D_\nu H_i) (D_\mu C_{L\lambda\rho\eta\xi}) \\ \tau_j^{Ii} H^{\dagger j} C_{L\eta\xi}^{\lambda\rho} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_i) (D_\mu W_L^{I\eta\xi}) \end{array} \right| \begin{array}{l} [45] \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 25 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle (\tau^{I_3})_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle (\tau^{I_3})_{i_5}^{i_4} \end{array} \quad (4.205)$$

Class $C_L^3 \phi^2 D^2$: 1 types

$$\mathcal{O}_{C_L^3 H H^\dagger D^2} \left| H_i H^{\dagger i} C_L^{\xi\tau\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \right| s_{45} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{i_5}^{i_4} \quad (4.206)$$

Class $C_R^2 F_L^3$: 2 types

$$\mathcal{O}_{C_R^2 W_L^3} \left| \epsilon^{IJK} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I W_L^{K\tau\eta} W_{L\tau}^J \epsilon^{i_1 i_2 i_3} \right| [45]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle \quad (4.207)$$

$$\mathcal{O}_{C_R^2 G_L^3} \left| f^{ABC} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A G_L^{C\tau\eta} G_{L\tau}^B \epsilon^{i_1 i_2 i_3} \right| [45]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle f^{A_1 A_2 A_3} \quad (4.208)$$

Class $C_L C_R^2 F_L^2$: 3 types

$$\mathcal{O}_{C_L C_R^2 B_L^2} \left| B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} \right| [45]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (4.209)$$

$$\mathcal{O}_{C_L C_R^2 W_L^2} \left| C_{L\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| [45]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} \quad (4.210)$$

$$\mathcal{O}_{C_L C_R^2 G_L^2} \left| C_{L\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| [45]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \quad (4.211)$$

Class $C_L F_L^2 F_R^2$: 14 types

$$\mathcal{O}_{C_L B_L^2 B_R^2} \left| B_L^{\lambda\rho} B_L^{\mu\nu} B_{R\eta\xi} B_R^{\eta\xi} C_{L\mu\nu\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (4.212)$$

$$\mathcal{O}_{C_L B_L^2 W_R^2} \left| B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} W_{R\eta\xi}^I W_R^{I\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_4 I_5} \quad (4.213)$$

$$\mathcal{O}_{C_L B_L B_R W_L W_R} \left| B_L^{\lambda\rho} B_{R\eta\xi} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} W_R^{I\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_3 I_5} \quad (4.214)$$

$$\mathcal{O}_{C_L B_R^2 W_L^2} \left| B_{R\eta\xi} B_R^{\eta\xi} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} \quad (4.215)$$

$$\mathcal{O}_{C_L B_L^2 G_R^2} \left| B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} G_{R\eta\xi}^A G_R^{A\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_4 A_5} \quad (4.216)$$

$$\mathcal{O}_{C_L B_L B_R G_L G_R} \left| B_L^{\lambda\rho} B_{R\eta\xi} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} G_R^{A\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_3 A_5} \quad (4.217)$$

$$\mathcal{O}_{C_L B_R^2 G_L^2} \left| B_{R\eta\xi} B_R^{\eta\xi} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \quad (4.218)$$

$$\mathcal{O}_{C_L W_L^2 W_R^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{J\mu\nu} W_{R\eta\xi}^I W_R^{J\eta\xi} \\ C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} W_{R\eta\xi}^K W_R^{K\eta\xi} \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_4} \delta^{I_3 I_5} \\ [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} \delta^{I_4 I_5} \end{array} \quad (4.219)$$

$$\mathcal{O}_{C_L G_R^2 W_L^2} \left| C_{L\mu\nu\lambda\rho} G_{R\eta\xi}^A G_R^{A\eta\xi} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_3} \delta^{A_4 A_5} \quad (4.220)$$

$$\mathcal{O}_{C_L G_L G_R W_L W_R} \left| C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_{R\eta\xi}^A W_L^{I\mu\nu} W_R^{I\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_3 I_5} \delta^{A_2 A_4} \quad (4.221)$$

$$\mathcal{O}_{C_L G_L^2 W_R^2} \left| C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} W_{R\eta\xi}^I W_R^{I\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_4 I_5} \delta^{A_2 A_3} \quad (4.222)$$

$$\mathcal{O}_{C_L B_L G_L G_R^2} \left| d^{ABC} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} G_{R\eta\xi}^B G_R^{C\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{A_3 A_4 A_5} \quad (4.223)$$

$$\mathcal{O}_{C_L B_R G_L^2 G_R} \left| d^{ABC} B_{R\eta\xi} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_R^{C\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{A_2 A_3 A_5} \quad (4.224)$$

$$\mathcal{O}_{C_L G_L^2 G_R^2}^{(1\sim 3)} \left| \begin{array}{l} d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_{R\eta\xi}^C G_R^{D\eta\xi} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} G_{R\eta\xi}^C G_R^{C\eta\xi} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_{R\eta\xi}^A G_R^{B\eta\xi} \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{E A_2 A_3} d^{E A_4 A_5} \\ [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \delta^{A_4 A_5} \\ [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_4} \delta^{A_3 A_5} \end{array} \quad (4.225)$$

Class $C_L^3 C_R^2$: 1 types

$$\mathcal{O}_{C_L^3 C_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{R\tau\nu\varphi\chi} C_R^{\tau\nu\varphi\chi} C_{L\eta\xi}^{\lambda\rho} \right| [45]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (4.226)$$

Class $C_L^3 F_R^2$: 3 types

$$\mathcal{O}_{C_L^3 B_R^2} \left| B_{R\tau\nu} B_R^{\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (4.227)$$

$$\mathcal{O}_{C_L^3 W_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} W_{R\tau\nu}^I W_R^{I\tau\nu} C_{L\eta\xi}^{\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{I_4 I_5} \quad (4.228)$$

$$\mathcal{O}_{C_L^3 G_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} G_{R\tau\nu}^A G_R^{A\tau\nu} C_{L\eta\xi}^{\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{A_4 A_5} \quad (4.229)$$

Class $C_L F_L F_R \psi \bar{\psi} D$: 27 types

$$\mathcal{O}_{C_L B_L B_R \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} B_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\rho) (\bar{e}_{R\rho} \gamma^\lambda e_{R\rho}) \\ B_R^{\eta\nu} B_{L\eta}^\rho C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{e}_{R\rho}) \gamma^\lambda e_{R\rho}) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \quad (4.230)$$

$$\mathcal{O}_{C_L B_L B_R \bar{l} l D}^{(1,2)} \left| \begin{array}{l} B_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu B_{L\eta}^\rho) (\bar{l}_{L\rho}^i \gamma^\lambda l_{L\rho}^i) \\ B_R^{\eta\nu} B_{L\eta}^\rho C_{L\nu\lambda\rho}^\mu (\bar{l}_{L\rho}^i \gamma^\lambda (D_\mu l_{L\rho}^i)) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \quad (4.231)$$

$$\mathcal{O}_{C_L B_L W_R \bar{l} \bar{D}}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{l}_{Lr}^j \gamma^\lambda l_{Lpi}) \\ \tau_j^{Ii} W_R^{I\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu (\bar{l}_{Lr}^j \gamma^\lambda (D_\mu l_{Lpi})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I5})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I5})_{i_4}^{i_3} \end{array} \quad (4.232)$$

$$\mathcal{O}_{C_L B_R W_L \bar{l} \bar{D}}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_{L\eta}{}^\rho) (\bar{l}_{Lr}^j \gamma^\lambda l_{Lpi}) \\ \tau_j^{Ii} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_{L\eta}{}^\rho (\bar{l}_{Lr}^j \gamma^\lambda (D_\mu l_{Lpi})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I2})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I2})_{i_4}^{i_3} \end{array} \quad (4.233)$$

$$\mathcal{O}_{C_L B_L B_R \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rra}) \\ B_R^{\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \end{array} \quad (4.234)$$

$$\mathcal{O}_{C_L B_L B_R \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rra}) \\ B_R^{\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \end{array} \quad (4.235)$$

$$\mathcal{O}_{C_L B_L G_R \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ \lambda_a^{Ab} G_R^{A\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A5})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A5})_{a_3}^{a_4} \end{array} \quad (4.236)$$

$$\mathcal{O}_{C_L B_L G_R \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb}) \\ \lambda_a^{Ab} G_R^{A\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A5})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A5})_{a_3}^{a_4} \end{array} \quad (4.237)$$

$$\mathcal{O}_{C_L B_R G_L \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_{L\eta}{}^\rho) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ \lambda_a^{Ab} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_{L\eta}{}^\rho ((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A2})_{a_3}^{a_4} \end{array} \quad (4.238)$$

$$\mathcal{O}_{C_L B_R G_L \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_{L\eta}{}^\rho) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb}) \\ \lambda_a^{Ab} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_{L\eta}{}^\rho ((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A2})_{a_3}^{a_4} \end{array} \quad (4.239)$$

$$\mathcal{O}_{C_L B_L B_R q \bar{q} D}^{(1,2)} \left| \begin{array}{l} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{q}_{Lr}^{ai} \gamma^\lambda q_{Lpai}) \\ B_R^{\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu (\bar{q}_{Lr}^{ai} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \end{array} \quad (4.240)$$

$$\mathcal{O}_{C_L B_L W_R q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{q}_{Lr}^{aj} \gamma^\lambda q_{Lpai}) \\ \tau_j^{Ii} W_R^{I\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu (\bar{q}_{Lr}^{aj} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} (\tau^{I5})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} (\tau^{I5})_{i_4}^{i_3} \end{array} \quad (4.241)$$

$$\mathcal{O}_{C_L B_R W_L q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_{L\eta}{}^\rho) (\bar{q}_{Lr}^{aj} \gamma^\lambda q_{Lpai}) \\ \tau_j^{Ii} B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_{L\eta}{}^\rho (\bar{q}_{Lr}^{aj} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} (\tau^{I2})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} (\tau^{I2})_{i_4}^{i_3} \end{array} \quad (4.242)$$

$$\mathcal{O}_{C_L B_L G_R q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \lambda^A{}_b G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_{L\eta}{}^\rho) (\bar{q}_{Lr}{}^{bi} \gamma^\lambda q_{Lpai}) \\ \lambda^A{}_b G_R^{A\eta\nu} B_{L\eta}{}^\rho C_{L\nu\lambda\rho}{}^\mu (\bar{q}_{Lr}{}^{bi} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} (\lambda^{A_5})_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} (\lambda^{A_5})_{a_4}^{a_3} \end{array} \quad (4.243)$$

$$\mathcal{O}_{C_L B_R G_L q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \lambda^A{}_b B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_\eta{}^\rho) (\bar{q}_{Lr}{}^{bi} \gamma^\lambda q_{Lpai}) \\ \lambda^A{}_b B_R^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_\eta{}^\rho (\bar{q}_{Lr}{}^{bi} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} (\lambda^{A_2})_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} (\lambda^{A_2})_{a_4}^{a_3} \end{array} \quad (4.244)$$

$$\mathcal{O}_{C_L W_L W_R \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{e}_{Rp} \gamma^\lambda e_{Rr}) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho ((D_\mu \bar{e}_{Rp}) \gamma^\lambda e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta^{I_2 I_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{I_2 I_5} \end{array} \quad (4.245)$$

$$\mathcal{O}_{C_L W_L W_R \bar{l} D}^{(1\sim 4)} \left| \begin{array}{l} \tau^{K i}{}_j \epsilon^{IJK} W_R^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{l}_{Lr}{}^j \gamma^\lambda l_{Lpi}) \\ \tau^{K i}{}_j \epsilon^{IJK} W_R^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho (\bar{l}_{Lr}{}^j \gamma^\lambda (D_\mu l_{Lpi})) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{l}_{Lr}{}^i \gamma^\lambda l_{Lpi}) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho (\bar{l}_{Lr}{}^i \gamma^\lambda (D_\mu l_{Lpi})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta^{I_5 I_2} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta^{I_5 I_2} \end{array} \quad (4.246)$$

$$\mathcal{O}_{C_L W_L W_R \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{d}_{Rp}{}^a \gamma^\lambda d_{Rra}) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho ((D_\mu \bar{d}_{Rp}{}^a) \gamma^\lambda d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta^{I_2 I_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \delta^{I_2 I_5} \end{array} \quad (4.247)$$

$$\mathcal{O}_{C_L W_L W_R \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{u}_{Rp}{}^a \gamma^\lambda u_{Rra}) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho ((D_\mu \bar{u}_{Rp}{}^a) \gamma^\lambda u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta^{I_2 I_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \delta^{I_2 I_5} \end{array} \quad (4.248)$$

$$\mathcal{O}_{C_L W_L W_R q \bar{q} D}^{(1\sim 4)} \left| \begin{array}{l} \tau^{K i}{}_j \epsilon^{IJK} W_R^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{q}_{Lr}{}^{aj} \gamma^\lambda q_{Lpai}) \\ \tau^{K i}{}_j \epsilon^{IJK} W_R^{J\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho (\bar{q}_{Lr}{}^{aj} \gamma^\lambda (D_\mu q_{Lpai})) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{q}_{Lr}{}^{ai} \gamma^\lambda q_{Lpai}) \\ W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho (\bar{q}_{Lr}{}^{ai} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \delta^{I_5 I_2} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \delta^{I_5 I_2} \end{array} \quad (4.249)$$

$$\mathcal{O}_{C_L G_R W_L q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \lambda^A{}_b \tau_j^{Ii} G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^I{}_\eta{}^\rho) (\bar{q}_{Lr}{}^{bj} \gamma^\lambda q_{Lpai}) \\ \lambda^A{}_b \tau_j^{Ii} G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu W_L^I{}_\eta{}^\rho (\bar{q}_{Lr}{}^{bj} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_5})_{a_4}^{a_3} (\tau^{I_2})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_5})_{a_4}^{a_3} (\tau^{I_2})_{i_4}^{i_3} \end{array} \quad (4.250)$$

$$\mathcal{O}_{C_L G_L W_R q \bar{q} D}^{(1,2)} \left| \begin{array}{l} \lambda^A{}_b \tau_j^{Ii} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_\eta{}^\rho) (\bar{q}_{Lr}{}^{bj} \gamma^\lambda q_{Lpai}) \\ \lambda^A{}_b \tau_j^{Ii} W_R^{I\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_\eta{}^\rho (\bar{q}_{Lr}{}^{bj} \gamma^\lambda (D_\mu q_{Lpai})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_4}^{a_3} (\tau^{I_5})_{i_4}^{i_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_4}^{a_3} (\tau^{I_5})_{i_4}^{i_3} \end{array} \quad (4.251)$$

$$\mathcal{O}_{C_L G_L G_R \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_\eta{}^\rho) (\bar{e}_{Rp} \gamma^\lambda e_{Rr}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_\eta{}^\rho ((D_\mu \bar{e}_{Rp}) \gamma^\lambda e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_5} \end{array} \quad (4.252)$$

$$\mathcal{O}_{C_L G_L G_R \bar{l} \bar{D}}^{(1,2)} \left| \begin{array}{l} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{l}_{Lr}^i \gamma^\lambda l_{Lpi} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\bar{l}_{Lr}^i \gamma^\lambda \left(D_\mu l_{Lpi} \right) \right) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta^{A_2 A_5} \left| \right. \quad (4.253)$$

$$\mathcal{O}_{C_L G_L G_R \bar{d}_R d_R D}^{(1\sim 6)} \left| \begin{array}{l} d^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb} \right) \\ d^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\lambda d_{Rrb} \right) \\ f^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb} \right) \\ f^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\lambda d_{Rrb} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{d}_{Rp}^a \gamma^\lambda d_{Rra} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\lambda d_{Rra} \right) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} \left(\lambda^C \right)_{a_3}^{a_4} \left| \right. \quad (4.254)$$

$$\mathcal{O}_{C_L G_L G_R \bar{u}_R u_R D}^{(1\sim 6)} \left| \begin{array}{l} d^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb} \right) \\ d^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{u}_{Rp}^a \right) \gamma^\lambda u_{Rrb} \right) \\ f^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb} \right) \\ f^{ABC} \lambda_a^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{u}_{Rp}^a \right) \gamma^\lambda u_{Rrb} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{u}_{Rp}^a \gamma^\lambda u_{Rra} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\left(D_\mu \bar{u}_{Rp}^a \right) \gamma^\lambda u_{Rra} \right) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} \left(\lambda^C \right)_{a_3}^{a_4} \left| \right. \quad (4.255)$$

$$\mathcal{O}_{C_L G_L G_R q \bar{q} D}^{(1\sim 6)} \left| \begin{array}{l} d^{ABC} \lambda_b^{Ca} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{q}_{Lr}^{bi} \gamma^\lambda q_{Lpai} \right) \\ d^{ABC} \lambda_b^{Ca} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\bar{q}_{Lr}^{bi} \gamma^\lambda \left(D_\mu q_{Lpai} \right) \right) \\ f^{ABC} \lambda_b^{Ca} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{q}_{Lr}^{bi} \gamma^\lambda q_{Lpai} \right) \\ f^{ABC} \lambda_b^{Ca} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\bar{q}_{Lr}^{bi} \gamma^\lambda \left(D_\mu q_{Lpai} \right) \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu \left(D_\mu G_L^A \eta^\rho \right) \left(\bar{q}_{Lr}^{ai} \gamma^\lambda q_{Lpai} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_L^A \eta^\rho \left(\bar{q}_{Lr}^{ai} \gamma^\lambda \left(D_\mu q_{Lpai} \right) \right) \end{array} \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} d^{CA_2 A_5} \left(\lambda^C \right)_{a_3}^{a_4} \left| \right. \quad (4.256)$$

Class $C_L^2 F_R \psi \bar{\psi} D$: 10 types

$$\mathcal{O}_{C_L^2 B_R \bar{e}_R e_R D} \left| B_R^{\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{e}_{Rp} \gamma^\eta e_{Rr} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \left| \right. \quad (4.257)$$

$$\mathcal{O}_{C_L^2 B_R \bar{l} l D} \left| B_R^{\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{l}_{Lr}^i \gamma^\eta l_{Lpi} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_4}^{i_3} \left| \right. \quad (4.258)$$

$$\mathcal{O}_{C_L^2 W_R \bar{l} l D} \left| \tau_j^{Ii} W_R^{I\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{l}_{Lr}^j \gamma^\eta l_{Lpi} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \left(\tau^{I5} \right)_{i_4}^{i_3} \left| \right. \quad (4.259)$$

$$\mathcal{O}_{C_L^2 B_R \bar{d}_R d_R D} \left| B_R^{\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{d}_{Rp}^a \gamma^\eta d_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \left| \right. \quad (4.260)$$

$$\mathcal{O}_{C_L^2 B_R \bar{u}_R u_R D} \left| B_R^{\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{u}_{Rp}^a \gamma^\eta u_{Rra} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \left| \right. \quad (4.261)$$

$$\mathcal{O}_{C_L^2 G_R \bar{d}_R d_R D} \left| \lambda_a^{Ab} G_R^{A\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{d}_{Rp}^a \gamma^\eta d_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \left(\lambda^{A5} \right)_{a_3}^{a_4} \left| \right. \quad (4.262)$$

$$\mathcal{O}_{C_L^2 G_R \bar{u}_R u_R D} \left| \lambda_a^{Ab} G_R^{A\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{u}_{Rp}^a \gamma^\eta u_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \left(\lambda^{A5} \right)_{a_3}^{a_4} \left| \right. \quad (4.263)$$

$$\mathcal{O}_{C_L^2 B_R q \bar{q} D} \left| B_R^{\xi\nu} C_{L\xi}^{\rho\lambda\mu} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{q}_{Lr}^{ai} \gamma^\eta q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_4}^{i_3} \delta_{a_4}^{a_3} \left| \right. \quad (4.264)$$

$$\mathcal{O}_{C_L^2 W_R q \bar{q} D} \left| \tau_j^{Ii} W_R^I \xi^\nu C_{L\xi}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{q}_{Lr}^{aj} \gamma^\eta q_{Lpai}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \left(\tau^{I5} \right)_{i_4}^{i_3} \Big| \quad (4.265)$$

$$\mathcal{O}_{C_L^2 G_R q \bar{q} D} \left| \lambda_b^{Aa} G_R^{A\xi\nu} C_{L\xi}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{q}_{Lr}^{bi} \gamma^\eta q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_4}^{i_3} \left(\lambda^{A5} \right)_{a_4}^{a_3} \Big| \quad (4.266)$$

Class $C_L F_R \psi^2 \phi D^2$: 8 types

$$\mathcal{O}_{C_L B_R \bar{e}_R l H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{e}_{Rp}) \sigma^{\eta\lambda} l_{Lri} \right) \\ H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu \bar{e}_{Rp}) \sigma^{\eta\lambda} (D_\nu l_{Lri}) \right) \\ H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{e}_{Rp} \sigma^{\eta\lambda} (D_\mu D_\nu l_{Lri}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \end{array} \Big| \quad (4.267)$$

$$\mathcal{O}_{C_L W_R \bar{e}_R l H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{e}_{Rp}) \sigma^{\eta\lambda} l_{Lri} \right) \\ \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu \bar{e}_{Rp}) \sigma^{\eta\lambda} (D_\nu l_{Lri}) \right) \\ \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{e}_{Rp} \sigma^{\eta\lambda} (D_\mu D_\nu l_{Lri}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \left(\tau^{I5} \right)_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \left(\tau^{I5} \right)_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \left(\tau^{I5} \right)_{i_4}^{i_3} \end{array} \Big| \quad (4.268)$$

$$\mathcal{O}_{C_L B_R \bar{d}_R q H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} q_{Lrai} \right) \\ H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} (D_\nu q_{Lrai}) \right) \\ H^{\dagger i} B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{d}_{Rp}^a \sigma^{\eta\lambda} (D_\mu D_\nu q_{Lrai}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \end{array} \Big| \quad (4.269)$$

$$\mathcal{O}_{C_L W_R \bar{d}_R q H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} q_{Lrai} \right) \\ \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} (D_\nu q_{Lrai}) \right) \\ \tau_j^{Ii} H^{\dagger j} W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{d}_{Rp}^a \sigma^{\eta\lambda} (D_\mu D_\nu q_{Lrai}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \left(\tau^{I5} \right)_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_3} \left(\tau^{I5} \right)_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_3} \left(\tau^{I5} \right)_{i_4}^{i_3} \end{array} \Big| \quad (4.270)$$

$$\mathcal{O}_{C_L G_R \bar{d}_R q H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \lambda_a^{Ab} H^{\dagger i} G_{R\eta}^A C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} q_{Lrbi} \right) \\ \lambda_a^{Ab} H^{\dagger i} G_{R\eta}^A C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} (D_\nu q_{Lrbi}) \right) \\ \lambda_a^{Ab} H^{\dagger i} G_{R\eta}^A C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{d}_{Rp}^a \sigma^{\eta\lambda} (D_\mu D_\nu q_{Lrbi}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{i_4}^{i_3} \left(\lambda^{A5} \right)_{a_2}^{a_3} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \left(\lambda^{A5} \right)_{a_2}^{a_3} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \left(\lambda^{A5} \right)_{a_2}^{a_3} \end{array} \Big| \quad (4.271)$$

$$\mathcal{O}_{C_L B_R q \bar{u}_R H D^2}^{(1\sim 3)} \left| \begin{array}{l} \epsilon^{ij} H_j B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{u}_{Rr}^a \sigma^{\eta\lambda} (D_\mu D_\nu q_{Lpai}) \right) \\ \epsilon^{ij} H_j B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\lambda} (D_\mu q_{Lpai}) \right) \\ \epsilon^{ij} H_j B_{R\eta}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\lambda} q_{Lpai} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \end{array} \Big| \quad (4.272)$$

$$\mathcal{O}_{C_L W_R q \bar{u}_R H D^2}^{(1\sim 3)} \left| \begin{array}{l} \tau_k^{Ii} \epsilon^{jk} H_j W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(\bar{u}_{Rr}^a \sigma^{\eta\lambda} (D_\mu D_\nu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\lambda} (D_\mu q_{Lpai}) \right) \\ \tau_k^{Ii} \epsilon^{jk} H_j W_{R\eta}^I C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{u}_{Rr}^a) \sigma^{\eta\lambda} q_{Lpai} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_3}^{a_2} \epsilon^{i_4 k} \left(\tau^{I5} \right)_k^{i_2} \\ \mathcal{C}_{f_2, f_3} [45]^2 \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_3}^{a_2} \epsilon^{i_4 k} \left(\tau^{I5} \right)_k^{i_2} \\ \mathcal{C}_{f_2, f_3} [35] [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_3}^{a_2} \epsilon^{i_4 k} \left(\tau^{I5} \right)_k^{i_2} \end{array} \Big| \quad (4.273)$$

$$\mathcal{O}_{C_L B_L W_R H H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} W_R^{I\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu B_{L\eta}{}^\rho) \\ \tau_j^{Ii} H^{\dagger j} W_R^{I\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\nu H_i) (D_\mu B_{L\eta}{}^\rho) \\ \tau_j^{Ii} H^{\dagger j} W_R^{I\eta\lambda} B_{L\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu H_i) \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle^2 (\tau^{I5})_{i_4}^{i_3} \\ [35]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I5})_{i_4}^{i_3} \\ [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I5})_{i_4}^{i_3} \end{array} \quad (4.297)$$

$$\mathcal{O}_{C_L B_R W_L H H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} B_R^{\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu W_L^I{}_\eta{}^\rho) \\ \tau_j^{Ii} H^{\dagger j} B_R^{\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\nu H_i) (D_\mu W_L^I{}_\eta{}^\rho) \\ \tau_j^{Ii} H^{\dagger j} B_R^{\eta\lambda} W_L^I{}_\eta{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu H_i) \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle^2 (\tau^{I2})_{i_4}^{i_3} \\ [35]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I2})_{i_4}^{i_3} \\ [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I2})_{i_4}^{i_3} \end{array} \quad (4.298)$$

$$\mathcal{O}_{C_L W_L W_R H H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} \tau_j^{Ki} \epsilon^{IJK} H_i H^{\dagger j} W_R^{J\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu W_L^I{}_\eta{}^\rho) \\ \tau_j^{Ki} \epsilon^{IJK} H^{\dagger j} W_R^{J\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\nu H_i) (D_\mu W_L^I{}_\eta{}^\rho) \\ \tau_j^{Ki} \epsilon^{IJK} H^{\dagger j} W_R^{J\eta\lambda} W_L^I{}_\eta{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu H_i) \\ H_i H^{\dagger i} W_R^{I\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu W_L^I{}_\eta{}^\rho) \\ H^{\dagger i} W_R^{I\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\nu H_i) (D_\mu W_L^I{}_\eta{}^\rho) \\ H^{\dagger i} W_R^{I\eta\lambda} W_L^I{}_\eta{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu H_i) \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle^2 \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ [35]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{I_2 I_5 K} (\tau^K)_{i_4}^{i_3} \\ [45]^2 \langle 12 \rangle^2 \langle 14 \rangle^2 \delta_{i_4}^{i_3} \delta^{I_5 I_2} \\ [35]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta^{I_5 I_2} \\ [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta^{I_5 I_2} \end{array} \quad (4.299)$$

$$\mathcal{O}_{C_L G_L G_R H H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} H_i H^{\dagger i} G_R^{A\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu G_L^A{}_\eta{}^\rho) \\ H^{\dagger i} G_R^{A\eta\lambda} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\nu H_i) (D_\mu G_L^A{}_\eta{}^\rho) \\ H^{\dagger i} G_R^{A\eta\lambda} G_L^A{}_\eta{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu H_i) \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle^2 \delta_{i_4}^{i_3} \delta^{A_2 A_5} \\ [35]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4}^{i_3} \delta^{A_2 A_5} \\ [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_4}^{i_3} \delta^{A_2 A_5} \end{array} \quad (4.300)$$

Class $C_L F_L \bar{\psi}^2 \phi D^2$: 8 types

$$\mathcal{O}_{C_L B_L \bar{q} u_R H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} (\bar{q}_{Lp}^{aj} u_{Rra}) \epsilon_{ij} C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H^{\dagger i}) (D_\mu B_L^{\lambda\rho}) \\ \epsilon_{ij} H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu B_L^{\lambda\rho}) \left((D_\nu \bar{q}_{Lp}^{aj}) u_{Rra} \right) \\ \epsilon_{ij} B_L^{\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H^{\dagger i}) \left((D_\nu \bar{q}_{Lp}^{aj}) u_{Rra} \right) \\ \epsilon_{ij} H^{\dagger i} C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu B_{L\eta}{}^\rho) (\bar{q}_{Lp}^{aj} \sigma^{\eta\lambda} u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_4, f_5} [34][35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_4, f_5} [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_4, f_5} [34][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \end{array} \quad (4.301)$$

$$\mathcal{O}_{C_L B_L e_R \bar{l} H D^2}^{(1\sim 4)} \left| \begin{array}{l} (\bar{l}_{Lr}^i e_{Rp}) C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu B_L^{\lambda\rho}) \\ H_i C_{L\lambda\rho}{}^{\nu\mu} (D_\mu B_L^{\lambda\rho}) (\bar{l}_{Lr}^i (D_\nu e_{Rp})) \\ B_L^{\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_i) (\bar{l}_{Lr}^i (D_\nu e_{Rp})) \\ H_i C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu B_{L\eta}{}^\rho) (\bar{l}_{Lr}^i \sigma^{\eta\lambda} e_{Rp}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34][35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \end{array} \quad (4.302)$$

$$\mathcal{O}_{C_L B_L d_R \bar{q} H D^2}^{(1\sim 4)} \left| \begin{array}{l} (\bar{q}_{Lr}^{ai} d_{Rpa}) C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) (D_\mu B_L^{\lambda\rho}) \\ H_i C_{L\lambda\rho}{}^{\nu\mu} (D_\mu B_L^{\lambda\rho}) (\bar{q}_{Lr}^{ai} (D_\nu d_{Rpa})) \\ B_L^{\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_i) (\bar{q}_{Lr}^{ai} (D_\nu d_{Rpa})) \\ H_i C_{L\lambda}{}^\nu{}_\rho{}^\mu (D_\mu D_\nu B_{L\eta}{}^\rho) (\bar{q}_{Lr}^{ai} \sigma^{\eta\lambda} d_{Rpa}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34][35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34][45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \end{array} \quad (4.303)$$

$$\mathcal{O}_{C_L W_L \bar{q} u_R H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \tau^{Ik} \epsilon_{jk} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau^{Ik} \epsilon_{jk} H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_L^{I\lambda\rho} \right) \left(\left(D_\nu \bar{q}_{Lp}^{aj} \right) u_{Rra} \right) \\ \tau^{Ik} \epsilon_{jk} W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu H^{\dagger i} \right) \left(\left(D_\nu \bar{q}_{Lp}^{aj} \right) u_{Rra} \right) \\ \tau^{Ik} \epsilon_{jk} H^{\dagger i} C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(D_\mu D_\nu W_{L\eta}^I{}^\rho \right) \left(\bar{q}_{Lp}^{aj} \sigma^{\eta\lambda} u_{Rra} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{a_4}^{a_5} \epsilon_{i_4 k} \left(\tau^{I_2} \right)_{i_3}^k \\ \mathcal{C}_{f_4, f_5} [34] [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_5} \epsilon_{i_4 k} \left(\tau^{I_2} \right)_{i_3}^k \\ \mathcal{C}_{f_4, f_5} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_4}^{a_5} \epsilon_{i_4 k} \left(\tau^{I_2} \right)_{i_3}^k \\ \mathcal{C}_{f_4, f_5} [34] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_5} \epsilon_{i_4 k} \left(\tau^{I_2} \right)_{i_3}^k \end{array} \quad (4.304)$$

$$\mathcal{O}_{C_L W_L e_R \bar{l} H D^2}^{(1\sim 4)} \left| \begin{array}{l} \left(\bar{l}_{Lr}^j e_{Rp} \right) \tau^{Ij} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau^{Ij} H_i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_L^{I\lambda\rho} \right) \left(\bar{l}_{Lr}^j \left(D_\nu e_{Rp} \right) \right) \\ \tau^{Ij} W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu H_i \right) \left(\bar{l}_{Lr}^j \left(D_\nu e_{Rp} \right) \right) \\ \tau^{Ij} H_i C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(D_\mu D_\nu W_{L\eta}^I{}^\rho \right) \left(\bar{l}_{Lr}^j \sigma^{\eta\lambda} e_{Rp} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34] [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\tau^{I_2} \right)_{i_5}^{i_3} \end{array} \quad (4.305)$$

$$\mathcal{O}_{C_L W_L d_R \bar{q} H D^2}^{(1\sim 4)} \left| \begin{array}{l} \left(\bar{q}_{Lr}^{aj} d_{Rpa} \right) \tau^{Ij} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau^{Ij} H_i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu W_L^{I\lambda\rho} \right) \left(\bar{q}_{Lr}^{aj} \left(D_\nu d_{Rpa} \right) \right) \\ \tau^{Ij} W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu H_i \right) \left(\bar{q}_{Lr}^{aj} \left(D_\nu d_{Rpa} \right) \right) \\ \tau^{Ij} H_i C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(D_\mu D_\nu W_{L\eta}^I{}^\rho \right) \left(\bar{q}_{Lr}^{aj} \sigma^{\eta\lambda} d_{Rpa} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{a_5}^{a_4} \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34] [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_4} \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_5}^{a_4} \left(\tau^{I_2} \right)_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [34] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_4} \left(\tau^{I_2} \right)_{i_5}^{i_3} \end{array} \quad (4.306)$$

$$\mathcal{O}_{C_L G_L \bar{q} u_R H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} \left(\bar{q}_{Lp}^{aj} u_{Rrb} \right) \lambda^{Ab} \epsilon_{ij} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left(D_\mu G_L^{A\lambda\rho} \right) \\ \lambda^{Ab} \epsilon_{ij} H^{\dagger i} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\left(D_\nu \bar{q}_{Lp}^{aj} \right) u_{Rrb} \right) \\ \lambda^{Ab} \epsilon_{ij} G_L^{A\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu H^{\dagger i} \right) \left(\left(D_\nu \bar{q}_{Lp}^{aj} \right) u_{Rrb} \right) \\ \lambda^{Ab} \epsilon_{ij} H^{\dagger i} C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(D_\mu D_\nu G_{L\eta}^A{}^\rho \right) \left(\bar{q}_{Lp}^{aj} \sigma^{\eta\lambda} u_{Rrb} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \epsilon_{i_3 i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34] [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon_{i_3 i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \epsilon_{i_3 i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_3 i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \end{array} \quad (4.307)$$

$$\mathcal{O}_{C_L G_L d_R \bar{q} H D^2}^{(1\sim 4)} \left| \begin{array}{l} \left(\bar{q}_{Lr}^{bi} d_{Rpa} \right) \lambda^{Aa} \epsilon_{ij} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H_i \right) \left(D_\mu G_L^{A\lambda\rho} \right) \\ \lambda^{Aa} \epsilon_{ij} H_i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\bar{q}_{Lr}^{bi} \left(D_\nu d_{Rpa} \right) \right) \\ \lambda^{Aa} \epsilon_{ij} G_L^{A\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu H_i \right) \left(\bar{q}_{Lr}^{bi} \left(D_\nu d_{Rpa} \right) \right) \\ \lambda^{Aa} \epsilon_{ij} H_i C_{L\lambda}{}^\nu{}_\rho{}^\mu \left(D_\mu D_\nu G_{L\eta}^A{}^\rho \right) \left(\bar{q}_{Lr}^{bi} \sigma^{\eta\lambda} d_{Rpa} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45]^2 \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34] [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [34] [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \end{array} \quad (4.308)$$

Class $C_L^2 F_R \phi^2 D^2$: 2 types

$$\mathcal{O}_{C_L^2 B_R H H^\dagger D^2} \left| H^{\dagger i} B_R^{\xi\lambda} C_{L\xi}{}^{\eta\rho\mu} \left(D_\nu H_i \right) \left(D_\mu C_{L\lambda\rho}{}^\nu \right) \right| [35] [45] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_4}^{i_3} \quad (4.309)$$

$$\mathcal{O}_{C_L^2 W_R H H^\dagger D^2} \left| \tau^{Ij} H^{\dagger j} W_R^{I\xi\lambda} C_{L\xi}{}^{\eta\rho\mu} \left(D_\nu H_i \right) \left(D_\mu C_{L\lambda\rho}{}^\nu \right) \right| [35] [45] \langle 12 \rangle^4 \langle 34 \rangle \left(\tau^{I_5} \right)_{i_4}^{i_3} \quad (4.310)$$

Class $C_L^2 \psi^2 \phi D^2$: 3 types

$$\mathcal{O}_{C_L^2 \bar{q} u_R H^\dagger D^2}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \\ \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu H^{\dagger i} \right) \\ \epsilon_{ij} H^{\dagger i} C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\left(D^\mu \bar{q}_{Lp}^{aj} \right) u_{Rra} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] s_{45} \langle 12 \rangle^4 \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_4, f_5} [45] s_{35} \langle 12 \rangle^4 \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_4, f_5} [45] s_{34} \langle 12 \rangle^4 \delta_{a_4}^{a_5} \epsilon_{i_3 i_4} \end{array} \quad (4.311)$$

$$\mathcal{O}_{C_L^2 e_R \bar{l} H D^2}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \\ \left(\bar{l}_{Lr}^i e_{Rp} \right) C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu H_i \right) \\ H_i C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{l}_{Lr}^i \left(D^\mu e_{Rp} \right) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] s_{45} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [45] s_{35} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_4, f_5} [45] s_{34} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \end{array} \quad (4.312)$$

$$\mathcal{O}_{C_L^2 d_R \bar{q} H D^2}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \\ \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(D^\mu H_i \right) \\ H_i C_L^{\nu\lambda\rho\eta} \left(D_\mu C_{L\nu\lambda\rho\eta} \right) \left(\bar{q}_{Lr}^{ai} \left(D^\mu d_{Rpa} \right) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] s_{45} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] s_{35} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] s_{34} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{a_5}^{a_4} \end{array} \quad (4.313)$$

Class $C_L \psi \bar{\psi} \phi^2 D^3$: 7 types

$$\mathcal{O}_{C_L \bar{e}_R e_R H H^\dagger D^3}^{(1\sim 5)} \left| \begin{array}{l} H^\dagger i C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H_i \right) \left(\left(D_\mu D_\nu \bar{e}_{Rp} \right) \gamma^\rho e_{Rr} \right) \\ H^\dagger i C_{L\rho}^{\lambda\nu\mu} \left(D_\lambda D_\nu H_i \right) \left(\left(D_\mu \bar{e}_{Rp} \right) \gamma^\rho e_{Rr} \right) \\ H_i C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(\left(D_\mu D_\nu \bar{e}_{Rp} \right) \gamma^\rho e_{Rr} \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\nu H_i \right) \left(D_\lambda H^\dagger i \right) \left(\left(D_\mu \bar{e}_{Rp} \right) \gamma^\rho e_{Rr} \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(D_\mu D_\nu H_i \right) \left(\bar{e}_{Rp} \gamma^\rho e_{Rr} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_3} \end{array} \quad (4.314)$$

$$\mathcal{O}_{C_L \bar{l} l H H^\dagger D^3}^{(1\sim 10)} \left| \begin{array}{l} H^\dagger i C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H_j \right) \left(\bar{l}_{Lr}^j \gamma^\rho \left(D_\mu D_\nu l_{Lpi} \right) \right) \\ H^\dagger i C_{L\rho}^{\lambda\nu\mu} \left(D_\lambda D_\nu H_j \right) \left(\bar{l}_{Lr}^j \gamma^\rho \left(D_\mu l_{Lpi} \right) \right) \\ H_j C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(\bar{l}_{Lr}^j \gamma^\rho \left(D_\mu D_\nu l_{Lpi} \right) \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\nu H_j \right) \left(D_\lambda H^\dagger i \right) \left(\bar{l}_{Lr}^j \gamma^\rho \left(D_\mu l_{Lpi} \right) \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(D_\mu D_\nu H_j \right) \left(\bar{l}_{Lr}^j \gamma^\rho l_{Lpi} \right) \\ H^\dagger j C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H_j \right) \left(\bar{l}_{Lr}^i \gamma^\rho \left(D_\mu D_\nu l_{Lpi} \right) \right) \\ H^\dagger j C_{L\rho}^{\lambda\nu\mu} \left(D_\lambda D_\nu H_j \right) \left(\bar{l}_{Lr}^i \gamma^\rho \left(D_\mu l_{Lpi} \right) \right) \\ H_j C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger j \right) \left(\bar{l}_{Lr}^i \gamma^\rho \left(D_\mu D_\nu l_{Lpi} \right) \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\nu H_j \right) \left(D_\lambda H^\dagger j \right) \left(\bar{l}_{Lr}^i \gamma^\rho \left(D_\mu l_{Lpi} \right) \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger j \right) \left(D_\mu D_\nu H_j \right) \left(\bar{l}_{Lr}^i \gamma^\rho l_{Lpi} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ \mathcal{C}_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \\ \mathcal{C}_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \end{array} \quad (4.315)$$

$$\mathcal{O}_{C_L \bar{d}_R u_R H^\dagger D^3}^{(1,2)} \left| \begin{array}{l} \epsilon_{ij} H^\dagger j C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(\left(D_\mu D_\nu \bar{d}_{Rp}^a \right) \gamma^\rho u_{Rra} \right) \\ \epsilon_{ij} H^\dagger j C_{L\rho}^{\lambda\nu\mu} \left(D_\lambda D_\nu H^\dagger i \right) \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho u_{Rra} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{a_2}^{a_5} \epsilon_{i_3 i_4} \\ \mathcal{C}_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \epsilon_{i_3 i_4} \end{array} \quad (4.316)$$

$$\mathcal{O}_{C_L \bar{d}_R d_R H H^\dagger D^3}^{(1\sim 5)} \left| \begin{array}{l} H^\dagger i C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H_i \right) \left(\left(D_\mu D_\nu \bar{d}_{Rp}^a \right) \gamma^\rho d_{Rra} \right) \\ H^\dagger i C_{L\rho}^{\lambda\nu\mu} \left(D_\lambda D_\nu H_i \right) \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho d_{Rra} \right) \\ H_i C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(\left(D_\mu D_\nu \bar{d}_{Rp}^a \right) \gamma^\rho d_{Rra} \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\nu H_i \right) \left(D_\lambda H^\dagger i \right) \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho d_{Rra} \right) \\ C_{L\rho}^{\nu\lambda\mu} \left(D_\lambda H^\dagger i \right) \left(D_\mu D_\nu H_i \right) \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rra} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ \mathcal{C}_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ \mathcal{C}_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ \mathcal{C}_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ \mathcal{C}_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \end{array} \quad (4.317)$$

$$\mathcal{O}_{C_L \bar{u}_R u_R H H^\dagger D^3}^{(1\sim 5)} \left| \begin{array}{l} H^{\dagger i} C_{L\rho}^{\nu\lambda\mu} (D_\lambda H_i) \left((D_\mu D_\nu \bar{u}_{R\rho}^a) \gamma^\rho u_{Rra} \right) \\ H^{\dagger i} C_{L\rho}^{\lambda\nu\mu} (D_\lambda D_\nu H_i) \left((D_\mu \bar{u}_{R\rho}^a) \gamma^\rho u_{Rra} \right) \\ H_i C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger i}) \left((D_\mu D_\nu \bar{u}_{R\rho}^a) \gamma^\rho u_{Rra} \right) \\ C_{L\rho}^{\nu\lambda\mu} (D_\nu H_i) (D_\lambda H^{\dagger i}) \left((D_\mu \bar{u}_{R\rho}^a) \gamma^\rho u_{Rra} \right) \\ C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger i}) (D_\mu D_\nu H_i) (\bar{u}_{R\rho}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} C_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \end{array} \quad (4.318)$$

$$\mathcal{O}_{C_L d_R \bar{u}_R H^2 D^3}^{(1,2)} \left| \begin{array}{l} \epsilon^{ij} H_j C_{L\rho}^{\nu\lambda\mu} (D_\lambda H_i) \left((D_\mu D_\nu \bar{u}_{R\rho}^a) \gamma^\rho d_{Rra} \right) \\ \epsilon^{ij} H_j C_{L\rho}^{\lambda\nu\mu} (D_\lambda D_\nu H_i) \left((D_\mu \bar{u}_{R\rho}^a) \gamma^\rho d_{Rra} \right) \end{array} \right| \begin{array}{l} C_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_4} \\ C_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \epsilon^{i_3 i_4} \end{array} \quad (4.319)$$

$$\mathcal{O}_{C_L q \bar{q} H H^\dagger D^3}^{(1\sim 10)} \left| \begin{array}{l} H^{\dagger i} C_{L\rho}^{\nu\lambda\mu} (D_\lambda H_j) (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu D_\nu q_{Lpai})) \\ H^{\dagger i} C_{L\rho}^{\lambda\nu\mu} (D_\lambda D_\nu H_j) (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu q_{Lpai})) \\ H_j C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger i}) (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu D_\nu q_{Lpai})) \\ C_{L\rho}^{\nu\lambda\mu} (D_\nu H_j) (D_\lambda H^{\dagger i}) (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu q_{Lpai})) \\ C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger i}) (D_\mu D_\nu H_j) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ H^{\dagger j} C_{L\rho}^{\nu\lambda\mu} (D_\lambda H_j) (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu D_\nu q_{Lpai})) \\ H^{\dagger j} C_{L\rho}^{\lambda\nu\mu} (D_\lambda D_\nu H_j) (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu q_{Lpai})) \\ H_j C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger j}) (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu D_\nu q_{Lpai})) \\ C_{L\rho}^{\nu\lambda\mu} (D_\nu H_j) (D_\lambda H^{\dagger j}) (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu q_{Lpai})) \\ C_{L\rho}^{\nu\lambda\mu} (D_\lambda H^{\dagger j}) (D_\mu D_\nu H_j) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} C_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [45]^2 \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35]^2 \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [34] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \\ C_{f_2, f_5} [35] [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_2} \delta_{i_4}^{i_3} \delta_{a_2}^{a_5} \end{array} \quad (4.320)$$

Class $C_L \phi^4 D^4$: 1 types

$$\mathcal{O}_{C_L H^2 H^{\dagger 2} D^4}^{(1\sim 4)} \left| \begin{array}{l} H^{\dagger i} H^{\dagger j} C_L^{\rho\nu\lambda\mu} (D_\mu D_\nu H_i) (D_\lambda D_\rho H_j) \\ H^{\dagger j} C_L^{\rho\nu\lambda\mu} (D_\lambda H_j) (D_\rho H^{\dagger i}) (D_\mu D_\nu H_i) \\ H_j H^{\dagger j} C_L^{\rho\nu\lambda\mu} (D_\mu D_\nu H_i) (D_\lambda D_\rho H^{\dagger i}) \\ H^{\dagger j} C_L^{\rho\nu\lambda\mu} (D_\mu H_i) (D_\nu H_j) (D_\lambda D_\rho H^{\dagger i}) \end{array} \right| \begin{array}{l} [45]^2 \langle 14 \rangle^2 \langle 15 \rangle^2 \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ [35]^2 \langle 13 \rangle^2 \langle 15 \rangle^2 \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ [34]^2 \langle 13 \rangle^2 \langle 14 \rangle^2 \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \\ [34] [35] \langle 13 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_4}^{i_2} \delta_{i_5}^{i_3} \end{array} \quad (4.321)$$

Class $C_L F_L \psi^4$: 11 types

$$\mathcal{O}_{C_L B_L \bar{d}_R \bar{e}_R \bar{u}_R^2}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y}_{[\overline{s} \overline{t}]} \epsilon_{abc} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} \bar{d}_{R\rho}^a C \bar{e}_{Rr} (\bar{u}_{Rs}^b \sigma^{\mu\nu} C \bar{u}_{Rt}^c) \\ \mathcal{Y}_{[\overline{s} \overline{t}]} \epsilon_{abc} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} (\bar{d}_{R\rho}^a \sigma_\eta{}^\nu C \bar{e}_{Rr}) (\bar{u}_{Rs}^b \sigma^{\eta\mu} C \bar{u}_{Rt}^c) \\ \mathcal{Y}_{[\overline{s} \overline{t}]} \epsilon_{abc} C_{L\mu\nu\lambda\rho} B_{L\eta}{}^\rho (\bar{d}_{R\rho}^a \sigma^{\lambda\eta} C \bar{e}_{Rr}) (\bar{u}_{Rs}^b \sigma^{\mu\nu} C \bar{u}_{Rt}^c) \\ \mathcal{Y}_{[\overline{s} \overline{t}]} \epsilon_{abc} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} \bar{u}_{Rs}^b C \bar{u}_{Rt}^c (\bar{d}_{R\rho}^a \sigma^{\mu\nu} C \bar{e}_{Rr}) \end{array} \right| \begin{array}{l} C_{f_3, f_4, f_5 f_6}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \langle 46 \rangle \epsilon_{a_3 a_5 a_6} \\ C_{f_3, f_4, f_5 f_6}^{[2]} \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \langle 36 \rangle \epsilon_{a_3 a_5 a_6} \\ C_{f_3, f_4, f_5 f_6}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \langle 26 \rangle \epsilon_{a_3 a_5 a_6} \\ C_{f_3, f_4, f_5 f_6}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 56 \rangle \epsilon_{a_3 a_5 a_6} \end{array} \quad (4.322)$$

Class $C_L F_L^2 \psi^2 \phi$: 16 types

$$\mathcal{O}_{C_L B_L^2 \bar{e}_R l H^\dagger}^{(1,2)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Lri}) H^{\dagger i} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \\ H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} B_{L\eta}{}^\nu (\bar{e}_{Rp} \sigma^{\eta\mu} l_{Lri}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \end{array} \quad (4.333)$$

$$\mathcal{O}_{C_L B_L^2 \bar{d}_R q H^\dagger}^{(1,2)} \left| \begin{array}{l} (\bar{d}_{Rp}^a q_{Lrai}) H^{\dagger i} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \\ H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} B_{L\eta}{}^\nu (\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \end{array} \quad (4.334)$$

$$\mathcal{O}_{C_L B_L^2 q \bar{u}_R H}^{(1,2)} \left| \begin{array}{l} (\bar{u}_{Rr}^a q_{Lpai}) \epsilon^{ij} H_j B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \\ \epsilon^{ij} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} B_{L\eta}{}^\nu (\bar{u}_{Rr}^a \sigma^{\eta\mu} q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_5}^{a_4} \epsilon^{i_4 i_6} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \epsilon^{i_4 i_6} \end{array} \quad (4.335)$$

$$\mathcal{O}_{C_L B_L W_L \bar{e}_R l H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Lri}) \tau_j^{Ii} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \\ \tau_j^{Ii} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_{L\eta}^I{}^\nu (\bar{e}_{Rp} \sigma^{\eta\mu} l_{Lri}) \\ \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} B_{L\eta}{}^\rho (\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle (\tau^{I_3})_{i_6}^{i_5} \end{array} \quad (4.336)$$

$$\mathcal{O}_{C_L B_L W_L \bar{d}_R q H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} (\bar{d}_{Rp}^a q_{Lrai}) \tau_j^{Ii} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \\ \tau_j^{Ii} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_{L\eta}^I{}^\nu (\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrai}) \\ \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} B_{L\eta}{}^\rho (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{a_4}^{a_5} (\tau^{I_3})_{i_6}^{i_5} \end{array} \quad (4.337)$$

$$\mathcal{O}_{C_L B_L W_L q \bar{u}_R H}^{(1\sim 3)} \left| \begin{array}{l} (\bar{u}_{Rr}^a q_{Lpai}) \tau_k^{Ii} \epsilon^{jk} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \\ \tau_k^{Ii} \epsilon^{jk} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_{L\eta}^I{}^\nu (\bar{u}_{Rr}^a \sigma^{\eta\mu} q_{Lpai}) \\ \tau_k^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} B_{L\eta}{}^\rho (\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \epsilon^{i_6 k} (\tau^{I_3})_k^{i_4} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \epsilon^{i_6 k} (\tau^{I_3})_k^{i_4} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{a_4}^{a_5} \epsilon^{i_6 k} (\tau^{I_3})_k^{i_4} \end{array} \quad (4.338)$$

$$\mathcal{O}_{C_L W_L^2 \bar{e}_R l H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Lri}) H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \\ H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^I{}^\nu (\bar{e}_{Rp} \sigma^{\eta\mu} l_{Lri}) \\ \tau_K^i \epsilon^{IJK} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^J{}^\nu (\bar{e}_{Rp} \sigma^{\eta\mu} l_{Lri}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{I_2 I_3 K} (\tau^K)_{i_6}^{i_5} \end{array} \quad (4.339)$$

$$\mathcal{O}_{C_L W_L^2 \bar{d}_R q H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} (\bar{d}_{Rp}^a q_{Lrai}) H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \\ H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^I{}^\nu (\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrai}) \\ \tau_K^i \epsilon^{IJK} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^J{}^\nu (\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \delta^{I_2 I_3} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \epsilon^{I_2 I_3 K} (\tau^K)_{i_6}^{i_5} \end{array} \quad (4.340)$$

$$\mathcal{O}_{C_L W_L^2 q \bar{u}_R H}^{(1\sim 3)} \left| \begin{array}{l} (\bar{u}_{Rr}^a q_{Lpai}) \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \\ \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^I{}^\nu (\bar{u}_{Rr}^a \sigma^{\eta\mu} q_{Lpai}) \\ \tau_K^i \epsilon^{IJK} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_{L\eta}^J{}^\nu (\bar{u}_{Rr}^a \sigma^{\eta\mu} q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_5}^{a_4} \delta^{I_2 I_3} \epsilon^{i_4 i_6} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \delta^{I_2 I_3} \epsilon^{i_4 i_6} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \epsilon^{i_6 k} \epsilon^{I_2 I_3 K} (\tau^K)_k^{i_4} \end{array} \quad (4.341)$$

$$\mathcal{O}_{C_L B_L G_L \bar{d}_R q H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} (\bar{d}_{Rp}^a q_{Lrbi}) \lambda_a^{Ab} H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \\ \lambda_a^{Ab} H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_{L\eta}^A{}^\nu (\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrbi}) \\ \lambda_a^{Ab} H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} B_{L\eta}{}^\rho (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \delta_{i_6}^{i_5} (\lambda^{A_3})_{a_4}^{a_5} \end{array} \quad (4.342)$$

$$\mathcal{O}_{C_L B_L G_L q \bar{u}_R H}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{u}_{Rr}^b q_{Lpai} \right) \lambda^A{}_b \epsilon^{ij} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \\ \lambda^A{}_b \epsilon^{ij} H_j B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^A{}_\eta{}^\nu \left(\bar{u}_{Rr}^b \sigma^{\eta\mu} q_{Lpai} \right) \\ \lambda^A{}_b \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} B_{L\eta}{}^\rho \left(\bar{u}_{Rr}^b \sigma^{\mu\nu} q_{Lpai} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \epsilon^{i_4 i_6} \left(\lambda^{A_3} \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{i_4 i_6} \left(\lambda^{A_3} \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \epsilon^{i_4 i_6} \left(\lambda^{A_3} \right)_{a_5}^{a_4} \end{array} \quad (4.343)$$

$$\mathcal{O}_{C_L G_L W_L \bar{d}_R q H^\dagger}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{d}_{Rp}^a q_{Lrbi} \right) \lambda^A{}_a \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^{I\mu\nu} \\ \lambda^A{}_a \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^I{}_\eta{}^\nu \left(\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrbi} \right) \\ \lambda^A{}_a \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} G_L^A{}_\eta{}^\rho \left(\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_5} \left(\tau^{I_3} \right)_{i_6}^{i_5} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_5} \left(\tau^{I_3} \right)_{i_6}^{i_5} \\ C_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_5} \left(\tau^{I_3} \right)_{i_6}^{i_5} \end{array} \quad (4.344)$$

$$\mathcal{O}_{C_L G_L W_L q \bar{u}_R H}^{(1\sim 3)} \left| \begin{array}{l} \left(\bar{u}_{Rr}^b q_{Lpai} \right) \lambda^A{}_b \tau_k^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^{I\mu\nu} \\ \lambda^A{}_b \tau_k^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^I{}_\eta{}^\nu \left(\bar{u}_{Rr}^b \sigma^{\eta\mu} q_{Lpai} \right) \\ \lambda^A{}_b \tau_k^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} G_L^A{}_\eta{}^\rho \left(\bar{u}_{Rr}^b \sigma^{\mu\nu} q_{Lpai} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \epsilon^{i_6 k} \left(\tau^{I_3} \right)_k^{i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{i_6 k} \left(\tau^{I_3} \right)_k^{i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 25 \rangle \epsilon^{i_6 k} \left(\tau^{I_3} \right)_k^{i_4} \left(\lambda^{A_2} \right)_{a_5}^{a_4} \end{array} \quad (4.345)$$

$$\mathcal{O}_{C_L G_L^2 \bar{e}_R l H^\dagger}^{(1,2)} \left| \begin{array}{l} \left(\bar{e}_{Rp} l_{Lri} \right) H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^A{}_\eta{}^\nu \left(\bar{e}_{Rp} \sigma^{\eta\mu} l_{Lri} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta^{A_2 A_3} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta^{A_2 A_3} \end{array} \quad (4.346)$$

$$\mathcal{O}_{C_L G_L^2 \bar{d}_R q H^\dagger}^{(1\sim 5)} \left| \begin{array}{l} \left(\bar{d}_{Rp}^a q_{Lrai} \right) H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^A{}_\eta{}^\nu \left(\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrai} \right) \\ \left(\bar{d}_{Rp}^a q_{Lrbi} \right) d^{ABC} \lambda^C{}_a H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \\ d^{ABC} \lambda^C{}_a H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^B{}_\eta{}^\nu \left(\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrbi} \right) \\ f^{ABC} \lambda^C{}_a H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^B{}_\eta{}^\nu \left(\bar{d}_{Rp}^a \sigma^{\eta\mu} q_{Lrbi} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \delta^{A_2 A_3} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} d^{CA_2 A_3} \left(\lambda^C \right)_{a_4}^{a_5} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} d^{CA_2 A_3} \left(\lambda^C \right)_{a_4}^{a_5} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} f^{CA_2 A_3} \left(\lambda^C \right)_{a_4}^{a_5} \end{array} \quad (4.347)$$

$$\mathcal{O}_{C_L G_L^2 q \bar{u}_R H}^{(1\sim 5)} \left| \begin{array}{l} \left(\bar{u}_{Rr}^a q_{Lpai} \right) \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^A{}_\eta{}^\nu \left(\bar{u}_{Rr}^a \sigma^{\eta\mu} q_{Lpai} \right) \\ \left(\bar{u}_{Rr}^b q_{Lpai} \right) d^{ABC} \lambda^C{}_b \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \\ d^{ABC} \lambda^C{}_b \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^B{}_\eta{}^\nu \left(\bar{u}_{Rr}^b \sigma^{\eta\mu} q_{Lpai} \right) \\ f^{ABC} \lambda^C{}_b \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^B{}_\eta{}^\nu \left(\bar{u}_{Rr}^b \sigma^{\eta\mu} q_{Lpai} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_5}^{a_4} \delta^{A_2 A_3} \epsilon^{i_4 i_6} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \delta^{A_2 A_3} \epsilon^{i_4 i_6} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \epsilon^{i_4 i_6} d^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{i_4 i_6} d^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_4} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \epsilon^{i_4 i_6} f^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_4} \end{array} \quad (4.348)$$

Class $C_L F_L^3 \phi^2$: 5 types

$$\mathcal{O}_{C_L B_L^2 W_L H H^\dagger} \left| \tau_j^{Ii} H_i H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\eta\mu} B_{L\eta}{}^\nu \right| \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \left(\tau^{I_4} \right)_{i_6}^{i_5} \quad (4.349)$$

$$\mathcal{O}_{C_L B_L W_L^2 H H^\dagger}^{(1,2)} \left| \begin{array}{l} H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\eta} W_L^{I\mu\nu} B_{L\eta}{}^\rho \\ \tau_j^{K i} \epsilon^{IJK} H_i H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{J\eta\mu} W_L^I{}_\eta{}^\nu \end{array} \right| \begin{array}{l} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{i_6}^{i_5} \delta^{I_3 I_4} \\ \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \epsilon^{I_3 I_4 K} \left(\tau^K \right)_{i_6}^{i_5} \end{array} \quad (4.350)$$

$$\mathcal{O}_{C_L W_L^3 H H^\dagger} \left| \tau_j^{Li} H_i H^{\dagger j} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{K\eta\mu} W_L^I{}_\eta{}^\nu \right| \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta^{I_4 L} \delta^{I_2 I_3} \left(\tau^L \right)_{i_6}^{i_5} \quad (4.351)$$

$$\mathcal{O}_{C_L B_L G_L^2 H H^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} G_L^{A\mu\nu} B_{L\eta}{}^\rho \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{i_6}^{i_5} \delta^{A_3 A_4} \quad (4.352)$$

$$\mathcal{O}_{C_L G_L^2 W_L H H^\dagger} \left| \tau_j^{Ii} H_i H^{\dagger j} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^{I\eta\mu} G_L^A{}_\eta{}^\nu \right| \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta^{A_2 A_3} \left(\tau^{I_4} \right)_{i_6}^{i_5} \quad (4.353)$$

Class $C_L^2\psi^4$: 4 types

$$\mathcal{O}_{C_L^2\bar{d}_R\bar{e}_R\bar{u}_R^2}^{(1\sim 3)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma_{\eta\xi} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma_{\eta\xi} C \bar{u}_{Rt}^c \right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\mu\nu} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma^{\eta\xi} C \bar{u}_{Rt}^c \right) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ \bar{s} \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \bar{d}_{Rp}^a C \bar{e}_{Rr} \bar{u}_{Rs}^b C \bar{u}_{Rt}^c \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2]} \langle 12 \rangle^4 \langle 35 \rangle \langle 46 \rangle \epsilon_{a_3 a_5 a_6} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle \epsilon_{a_3 a_5 a_6} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[1,1]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \epsilon_{a_3 a_5 a_6} \end{array} \quad (4.354)$$

$$\mathcal{O}_{C_L^2\bar{e}_R l q \bar{u}_R}^{(1\sim 3)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Ri}) (\bar{u}_{Rt}^a q_{Lsaj}) \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \\ \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma_{\eta\xi} l_{Ri}) (\bar{u}_{Rt}^a \sigma^{\eta\xi} q_{Lsaj}) \\ \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{e}_{Rp} \sigma^{\mu\nu} l_{Ri}) (\bar{u}_{Rt}^a \sigma^{\eta\xi} q_{Lsaj}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3,f_4,f_5,f_6} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \delta_{a_6}^{a_5} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6} \langle 12 \rangle^4 \langle 35 \rangle \langle 46 \rangle \delta_{a_6}^{a_5} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle \delta_{a_6}^{a_5} \epsilon^{i_4 i_5} \end{array} \quad (4.355)$$

$$\mathcal{O}_{C_L^2\bar{d}_R q^2 \bar{u}_R}^{(1\sim 6)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix} \right] (\bar{d}_{Rp}^a q_{Lrbi}) (\bar{u}_{Rt}^b q_{Lsaj}) \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} q_{Lrbi}) (\bar{u}_{Rt}^b \sigma^{\eta\xi} q_{Lsaj}) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi}) (\bar{u}_{Rt}^b \sigma^{\eta\xi} q_{Lsaj}) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ \bar{r} \end{smallmatrix} \right] (\bar{d}_{Rp}^a q_{Lrbi}) (\bar{u}_{Rt}^b q_{Lsaj}) \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ \bar{r} \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} q_{Lrbi}) (\bar{u}_{Rt}^b \sigma^{\eta\xi} q_{Lsaj}) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ \bar{r} \end{smallmatrix} \right] \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi}) (\bar{u}_{Rt}^b \sigma^{\eta\xi} q_{Lsaj}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2]} \langle 12 \rangle^4 \langle 35 \rangle \langle 46 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[1,1]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[1,1]} \langle 12 \rangle^4 \langle 35 \rangle \langle 46 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \epsilon^{i_4 i_5} \end{array} \quad (4.356)$$

$$\mathcal{O}_{C_L^2 l q^3}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s & t \\ \bar{r} & \bar{s} & \bar{t} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} l_{Lpi} C q_{Lraj} q_{Lsbk} C q_{Ltcl} \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} l_{Lpi} C q_{Lraj} q_{Lsbk} C q_{Ltcl} \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (l_{Lpi} C \sigma^{\mu\nu} q_{Lraj}) (q_{Lsbk} C \sigma^{\eta\xi} q_{Ltcl}) \\ \mathcal{Y} \left[\begin{smallmatrix} r \\ \bar{r} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} l_{Lpi} C q_{Lraj} q_{Lsbk} C q_{Ltcl} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3,f_4,f_5,f_6}^{[3]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \epsilon^{a_4 a_5 a_6} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2,1]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \epsilon^{a_4 a_5 a_6} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[2,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 25 \rangle \langle 26 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \epsilon^{a_4 a_5 a_6} \\ \mathcal{C}_{f_3,f_4,f_5,f_6}^{[1,1,1]} \langle 12 \rangle^4 \langle 34 \rangle \langle 56 \rangle \epsilon^{i_3 i_5} \epsilon^{i_4 i_6} \epsilon^{a_4 a_5 a_6} \end{array} \quad (4.357)$$

Class $C_L^2 F_L \psi^2 \phi$: 8 types

$$\mathcal{O}_{C_L^2 B_L \bar{e}_R l H^\dagger}^{(1,2)} \left| \begin{array}{l} H^{\dagger i} B_{L\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma^{\eta\xi} l_{Ri}) \\ H^{\dagger i} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{e}_{Rp} \sigma^{\eta\xi} l_{Ri}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4,f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \\ \mathcal{C}_{f_4,f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_6}^{i_5} \end{array} \quad (4.358)$$

$$\mathcal{O}_{C_L^2 B_L \bar{d}_R q H^\dagger}^{(1,2)} \left| \begin{array}{l} H^{\dagger i} B_{L\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai}) \\ H^{\dagger i} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4,f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4,f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \end{array} \quad (4.359)$$

$$\mathcal{O}_{C_L^2 B_L q \bar{u}_R H}^{(1,2)} \left| \begin{array}{l} \epsilon^{ij} H_j B_{L\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai}) \\ \epsilon^{ij} H_j B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho} (\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4,f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \epsilon^{i_4 i_6} \\ \mathcal{C}_{f_4,f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_5}^{a_4} \epsilon^{i_4 i_6} \end{array} \quad (4.360)$$

$$\mathcal{O}_{C_L^2 W_L \bar{e}_R l H^\dagger}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_{L\eta\xi}^I (\bar{e}_{Rp} \sigma^{\eta\xi} l_{Ri}) \\ \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\bar{e}_{Rp} \sigma^{\eta\xi} l_{Ri}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4,f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4,f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle (\tau^{I_3})_{i_6}^{i_5} \end{array} \quad (4.361)$$

$$\mathcal{O}_{C_L^2 W_L \bar{d}_R q H^\dagger}^{(1,2)} \left| \begin{array}{l} \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_{L\eta\xi}^I (\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai}) \\ \tau_j^{Ii} H^{\dagger j} C_{L\mu\nu\lambda\rho} W_{L\eta\xi}^{I\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4,f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} (\tau^{I_3})_{i_6}^{i_5} \\ \mathcal{C}_{f_4,f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_4}^{a_5} (\tau^{I_3})_{i_6}^{i_5} \end{array} \quad (4.362)$$

$$\mathcal{O}_{C_L^2 W_L q \bar{u}_R H}^{(1,2)} \left| \frac{\tau^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_L^I \eta^\xi \left(\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai} \right)}{\tau^{Ii} \epsilon^{jk} H_j C_{L\mu\nu\lambda\rho} W_L^I \eta^\xi C_{L\eta\xi}^{\lambda\rho} \left(\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai} \right)} \left| \frac{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{a_5}^{a_4} \epsilon^{i_6 k} \left(\tau^{I_3} \right)_k^{i_4}}{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_5}^{a_4} \epsilon^{i_6 k} \left(\tau^{I_3} \right)_k^{i_4}} \right| \right| \quad (4.363)$$

$$\mathcal{O}_{C_L^2 G_L \bar{d}_R q H^\dagger}^{(1,2)} \left| \frac{\lambda^{Ab} H^\dagger_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A \eta^\xi \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrbi} \right)}{\lambda^{Ab} H^\dagger_i C_{L\mu\nu\lambda\rho} G_L^A \eta^\xi C_{L\eta\xi}^{\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrbi} \right)} \left| \frac{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{i_6}^{i_5} \left(\lambda^{A_3} \right)_{a_5}^{a_4}}{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{i_6}^{i_5} \left(\lambda^{A_3} \right)_{a_4}^{a_5}} \right| \right| \quad (4.364)$$

$$\mathcal{O}_{C_L^2 G_L q \bar{u}_R H}^{(1,2)} \left| \frac{\lambda^{Aa} \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A \eta^\xi \left(\bar{u}_{Rr}^b \sigma^{\eta\xi} q_{Lpai} \right)}{\lambda^{Aa} \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} G_L^A \eta^\xi C_{L\eta\xi}^{\lambda\rho} \left(\bar{u}_{Rr}^b \sigma^{\eta\xi} q_{Lpai} \right)} \left| \frac{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \epsilon^{i_4 i_6} \left(\lambda^{A_3} \right)_{a_5}^{a_4}}{\mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \epsilon^{i_4 i_6} \left(\lambda^{A_3} \right)_{a_5}^{a_4}} \right| \right| \quad (4.365)$$

Class $C_L^2 F_L^2 \phi^2$: 4 types

$$\mathcal{O}_{C_L^2 B_L^2 H H^\dagger}^{(1,2)} \left| \frac{H_i H^\dagger_i B_{L\eta\xi} B_L^{\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho}}{H_i H^\dagger_i B_L^{\eta\xi} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} C_{L\eta\xi}^{\lambda\rho}} \left| \frac{\langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{i_6}^{i_5}}{\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{i_6}^{i_5}} \right| \right| \quad (4.366)$$

$$\mathcal{O}_{C_L^2 B_L W_L H H^\dagger}^{(1,2)} \left| \frac{\tau^{Ii} H_i H^\dagger_j B_{L\eta\xi} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_L^I \eta^\xi}{\tau^{Ii} H_i H^\dagger_j B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} W_L^I \eta^\xi C_{L\eta\xi}^{\lambda\rho}} \left| \frac{\langle 12 \rangle^4 \langle 34 \rangle^2 \left(\tau^{I_4} \right)_{i_6}^{i_5}}{\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \left(\tau^{I_4} \right)_{i_6}^{i_5}} \right| \right| \quad (4.367)$$

$$\mathcal{O}_{C_L^2 W_L^2 H H^\dagger}^{(1,2)} \left| \frac{H_i H^\dagger_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} W_L^I \eta^\xi W_L^I \eta^\xi}{H_i H^\dagger_i C_{L\mu\nu\lambda\rho} W_L^I \eta^\xi W_L^I \eta^\xi C_{L\eta\xi}^{\lambda\rho}} \left| \frac{\langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{i_6}^{i_5} \delta^{I_3 I_4}}{\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{i_6}^{i_5} \delta^{I_3 I_4}} \right| \right| \quad (4.368)$$

$$\mathcal{O}_{C_L^2 G_L^2 H H^\dagger}^{(1,2)} \left| \frac{H_i H^\dagger_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A \eta^\xi G_L^A \eta^\xi}{H_i H^\dagger_i C_{L\mu\nu\lambda\rho} G_L^A \eta^\xi G_L^A \eta^\xi C_{L\eta\xi}^{\lambda\rho}} \left| \frac{\langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{i_6}^{i_5} \delta^{A_3 A_4}}{\langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{i_6}^{i_5} \delta^{A_3 A_4}} \right| \right| \quad (4.369)$$

Class $C_L^3 \psi^2 \phi$: 3 types

$$\mathcal{O}_{C_L^3 \bar{e}_R l H^\dagger} \left| \left(\bar{e}_{Rp} l_{Lri} \right) H^\dagger_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \right| \right| \quad (4.370)$$

$$\mathcal{O}_{C_L^3 \bar{d}_R q H^\dagger} \left| \left(\bar{d}_{Rp}^a q_{Lrai} \right) H^\dagger_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \delta_{i_6}^{i_5} \delta_{a_4}^{a_5} \right| \right| \quad (4.371)$$

$$\mathcal{O}_{C_L^3 q \bar{u}_R H} \left| \left(\bar{u}_{Rr}^a q_{Lpai} \right) \epsilon^{ij} H_j C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \delta_{a_5}^{a_4} \epsilon^{i_4 i_6} \right| \right| \quad (4.372)$$

Class $C_L^4 \phi^2$: 1 types

$$\mathcal{O}_{C_L^4 H H^\dagger} \left| H_i H^\dagger_i C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\eta\xi\tau\nu} C_L^{\mu\nu\lambda\rho} \left| \langle 12 \rangle^4 \langle 34 \rangle^4 \delta_{i_6}^{i_5} \right| \right| \quad (4.373)$$

Class $C_L F_L \psi^2 \bar{\psi}^2$: 54 types

$$\mathcal{O}_{C_L B_L \bar{e}_R^2 e_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{e}_{Rr} \gamma^\lambda e_{Rt} \right) \left| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \right| \quad (4.374)$$

$$\mathcal{O}_{C_L B_L \bar{e}_R e_R l \bar{l}} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{l}_{Lt}^i \gamma^\lambda l_{Lri} \right) \left| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \right| \right| \quad (4.375)$$

$$\mathcal{O}_{C_L B_L d_R \bar{e}_R l \bar{q}} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho d_{Rsa} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\lambda l_{Lri} \right) \left| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \right| \right| \quad (4.376)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R \bar{l} l} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{l}_{Lt}^i \gamma^\lambda l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_5} \left| \right. \quad (4.377)$$

$$\mathcal{O}_{C_L B_L \bar{l} \bar{u}_R u_R} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma^\rho l_{Lpi} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_6} \left| \right. \quad (4.378)$$

$$\mathcal{O}_{C_L B_L \bar{e}_R e_R q \bar{q}} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\lambda q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_4}^{a_6} \left| \right. \quad (4.379)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R e_R \bar{l} q} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\bar{l}_{Lt}^i \gamma^\lambda q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_4} \left| \right. \quad (4.380)$$

$$\mathcal{O}_{C_L B_L l^2 \bar{l}^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{s} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma^\rho l_{Lpi} \right) \left(\bar{l}_{Lt}^j \gamma^\lambda l_{Lrj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [1,1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma^\rho l_{Lpi} \right) \left(\bar{l}_{Lt}^j \gamma^\lambda l_{Lrj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \left| \right. \quad (4.381)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R \bar{e}_R e_R} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{e}_{Rr} \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \left| \right. \quad (4.382)$$

$$\mathcal{O}_{C_L B_L \bar{e}_R e_R \bar{u}_R u_R} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_6} \left| \right. \quad (4.383)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R^2 d_R^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{s} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{d}_{Rr}^b \gamma^\lambda d_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [1,1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{d}_{Rr}^b \gamma^\lambda d_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \left| \right. \quad (4.384)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R \bar{u}_R u_R}^{(1,2)} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \left| \right. \\ \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsb} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_6} \delta_{a_4}^{a_5} \left| \right. \quad (4.385)$$

$$\mathcal{O}_{C_L B_L \bar{u}_R^2 u_R^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{s} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [1,1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \left| \right. \\ \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \left| \right. \quad (4.386)$$

$$\mathcal{O}_{C_L B_L \bar{e}_R q^2 \bar{u}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{r} \\ \overline{s} \end{smallmatrix} \right] \epsilon_{abc} \epsilon_{ij} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma^\rho C \bar{q}_{Ls}^{bi} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda C \bar{q}_{Lt}^{cj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_5 i_6} \epsilon_{a_4 a_5 a_6} \left| \right. \quad (4.387)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R \bar{l} \bar{q} \bar{u}_R} \left| \epsilon_{abc} \epsilon_{ij} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{l}_{Ls}^i \right) \left(\bar{u}_{Rr}^b \gamma^\lambda C \bar{q}_{Lt}^{cj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_5 i_6} \epsilon_{a_3 a_4 a_6} \left| \right. \quad (4.388)$$

$$\mathcal{O}_{C_L B_L d_R l q u_R} \left| \epsilon^{abc} \epsilon^{ij} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(l_{Lpi} C \gamma^\rho d_{Rsb} \right) \left(q_{Lraj} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_4} \epsilon^{a_4 a_5 a_6} \left| \right. \quad (4.389)$$

$$\mathcal{O}_{C_L B_L e_R q^2 u_R} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{r} \\ \overline{s} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ij} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(q_{Lpai} C \gamma^\rho e_{Rs} \right) \left(q_{Lrbj} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_3 i_4} \epsilon^{a_3 a_4 a_6} \left| \right. \quad (4.390)$$

$$\mathcal{O}_{C_L B_L \bar{l} \bar{q} \bar{q}}^{(1,2)} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma^\rho l_{Lpi} \right) \left(\bar{q}_{Lt}^{aj} \gamma^\lambda q_{Lraj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_6}^{a_4} \left| \right. \\ \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^j \gamma^\rho l_{Lpi} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\lambda q_{Lraj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_6}^{a_4} \left| \right. \quad (4.391)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R q \bar{q}}^{(1,2)} \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{q}_{Lt}^{bi} \gamma^\lambda q_{Lrbi} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \left| \right. \\ \left| B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsc} \right) \left(\bar{q}_{Lt}^{ci} \gamma^\lambda q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_4} \delta_{a_6}^{a_5} \left| \right. \quad (4.392)$$

$$\mathcal{O}_{C_L B_L q \bar{q} \bar{u}_R u_R}^{(1,2)} \left| \begin{array}{l} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ci} \gamma^\rho q_{Lpai}) (\bar{u}_{Rr}^a \gamma^\lambda u_{Rtc}) \\ B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ai} \gamma^\rho q_{Lpai}) (\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb}) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_3} \delta_{a_5}^{a_6} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_5}^{a_3} \delta_{a_4}^{a_6} \Big| \quad (4.393)$$

$$\mathcal{O}_{C_L B_L q^2 \bar{q}^2}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ai} \gamma^\rho q_{Lpai}) (\bar{q}_{Lt}^{bj} \gamma^\lambda q_{Lrbj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{aj} \gamma^\rho q_{Lpai}) (\bar{q}_{Lt}^{bi} \gamma^\lambda q_{Lrbj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ai} \gamma^\rho q_{Lpai}) (\bar{q}_{Lt}^{bj} \gamma^\lambda q_{Lrbj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} (\bar{q}_{Ls}^{aj} \gamma^\rho q_{Lpai}) (\bar{q}_{Lt}^{bi} \gamma^\lambda q_{Lrbj}) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [1, 1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [1, 1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1, 1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1, 1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \Big| \quad (4.394)$$

$$\mathcal{O}_{C_L W_L \bar{e}_R e_R l \bar{l}} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{e}_{Rp} \gamma^\rho e_{Rs}) (\bar{l}_{Lt}^j \gamma^\lambda l_{Lri}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^I{}_2)_{i_6}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^I{}_2)_{i_6}^{i_4} \Big| \quad (4.395)$$

$$\mathcal{O}_{C_L W_L d_R \bar{e}_R l \bar{q}} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{e}_{Rp} \gamma^\rho d_{Rsa}) (\bar{q}_{Lt}^{aj} \gamma^\lambda l_{Lri}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} (\tau^I{}_2)_{i_6}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} (\tau^I{}_2)_{i_6}^{i_4} \Big| \quad (4.396)$$

$$\mathcal{O}_{C_L W_L \bar{d}_R d_R l \bar{l}} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{d}_{Rp}^a \gamma^\rho d_{Rsa}) (\bar{l}_{Lt}^j \gamma^\lambda l_{Lri}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} (\tau^I{}_2)_{i_6}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} (\tau^I{}_2)_{i_6}^{i_4} \Big| \quad (4.397)$$

$$\mathcal{O}_{C_L W_L l \bar{l} \bar{u}_R u_R} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^j \gamma^\rho l_{Lpi}) (\bar{u}_{Rr}^a \gamma^\lambda u_{Rta}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_6} (\tau^I{}_2)_{i_5}^{i_3} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_6} (\tau^I{}_2)_{i_5}^{i_3} \Big| \quad (4.398)$$

$$\mathcal{O}_{C_L W_L \bar{e}_R e_R q \bar{q}} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{e}_{Rp} \gamma^\rho e_{Rs}) (\bar{q}_{Lt}^{aj} \gamma^\lambda q_{Lrai}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_4} (\tau^I{}_2)_{i_6}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_4} (\tau^I{}_2)_{i_6}^{i_4} \Big| \quad (4.399)$$

$$\mathcal{O}_{C_L W_L \bar{d}_R e_R l \bar{q}} \left| \tau^I{}_j C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{d}_{Rp}^a \gamma^\rho e_{Rs}) (\bar{l}_{Lt}^j \gamma^\lambda q_{Lrai}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} (\tau^I{}_2)_{i_6}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} (\tau^I{}_2)_{i_6}^{i_4} \Big| \quad (4.400)$$

$$\mathcal{O}_{C_L W_L l^2 l^2}^{(1\sim 3)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] \tau^{Ij}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^k \gamma^\rho l_{Lpi}) (\bar{l}_{Lt}^i \gamma^\lambda l_{Lrj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] \tau^{Ij}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^k \gamma^\rho l_{Lpi}) (\bar{l}_{Lt}^i \gamma^\lambda l_{Lrj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] \tau^{Ij}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^k \gamma^\rho l_{Lpi}) (\bar{l}_{Lt}^i \gamma^\lambda l_{Lrj}) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} (\tau^I{}_2)_{i_5}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1, 1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} (\tau^I{}_2)_{i_5}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1, 1], [1, 1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} (\tau^I{}_2)_{i_5}^{i_4} \Big| \quad (4.401)$$

$$\mathcal{O}_{C_L W_L \bar{e}_R \bar{q}^2 \bar{u}_R} \left| \tau^I{}_k \epsilon_{abc} \epsilon_{jk} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{e}_{Rp} \gamma^\rho C \bar{q}_{Ls}^{bi}) (\bar{u}_{Rr}^a \gamma^\lambda C \bar{q}_{Lt}^{cj}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_6 k} \epsilon_{a_4 a_5 a_6} (\tau^I{}_2)_{i_5}^k \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_6 k} \epsilon_{a_4 a_5 a_6} (\tau^I{}_2)_{i_5}^k \Big| \quad (4.402)$$

$$\mathcal{O}_{C_L W_L d_R l \bar{q} \bar{u}_R} \left| \tau^I{}_k \epsilon_{abc} \epsilon_{jk} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{d}_{Rp}^a \gamma^\rho C \bar{l}_{Ls}^i) (\bar{u}_{Rr}^b \gamma^\lambda C \bar{q}_{Lt}^{cj}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_6 k} \epsilon_{a_3 a_4 a_6} (\tau^I{}_2)_{i_5}^k \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{i_6 k} \epsilon_{a_3 a_4 a_6} (\tau^I{}_2)_{i_5}^k \Big| \quad (4.403)$$

$$\mathcal{O}_{C_L W_L d_R l q u_R} \left| \tau^I{}_k \epsilon^{abc} \epsilon^{jk} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (l_{Lpi} C \gamma^\rho d_{Rsb}) (q_{Lra j} C \gamma^\lambda u_{Rtc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_4 k} \epsilon^{a_4 a_5 a_6} (\tau^I{}_2)_k^{i_3} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_4 k} \epsilon^{a_4 a_5 a_6} (\tau^I{}_2)_k^{i_3} \Big| \quad (4.404)$$

$$\mathcal{O}_{C_L W_L e_R q^2 u_R} \left| \mathcal{Y} \left[\begin{array}{c} \boxed{p}, \boxed{r} \\ \boxed{s}, \boxed{t} \end{array} \right] \tau^I{}_k \epsilon^{abc} \epsilon^{jk} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (q_{Lpai} C \gamma^\rho e_{Rs}) (q_{Lrb j} C \gamma^\lambda u_{Rtc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_4 k} \epsilon^{a_3 a_4 a_6} (\tau^I{}_2)_k^{i_3} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{i_4 k} \epsilon^{a_3 a_4 a_6} (\tau^I{}_2)_k^{i_3} \Big| \quad (4.405)$$

$$\mathcal{O}_{C_L W_L l \bar{l} q \bar{q}}^{(1\sim 3)} \left| \begin{array}{l} \tau^{Ij}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^k \gamma^\rho l_{Lpi}) (\bar{q}_{Lt}^{ai} \gamma^\lambda q_{Lra j}) \\ \tau^{Ii}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^k \gamma^\rho l_{Lpi}) (\bar{q}_{Lt}^{aj} \gamma^\lambda q_{Lra j}) \\ \tau^{Ii}{}_k C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} (\bar{l}_{Ls}^j \gamma^\rho l_{Lpi}) (\bar{q}_{Lt}^{al} \gamma^\lambda q_{Lra j}) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{a_6}^{a_4} (\tau^I{}_2)_{i_5}^{i_4} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_4} (\tau^I{}_2)_{i_5}^{i_3} \Big| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \delta_{a_6}^{a_4} (\tau^I{}_2)_{i_6}^{i_3} \Big| \quad (4.406)$$

Class $C_L F_L^2 \bar{\psi}^2 \phi$: 16 types

$$\mathcal{O}_{C_L B_L^2 \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_6} \epsilon_{i_4 i_5} \left| \quad (4.428)$$

$$\mathcal{O}_{C_L B_L^2 e_R \bar{l} H} \left| \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \left| \quad (4.429)$$

$$\mathcal{O}_{C_L B_L^2 d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \left| \quad (4.430)$$

$$\mathcal{O}_{C_L B_L W_L \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \tau^{Ik} \epsilon_{jk} H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_6} \epsilon_{i_5 k} \left(\tau^{I_3} \right)_{i_4}^k \left| \quad (4.431)$$

$$\mathcal{O}_{C_L B_L W_L e_R \bar{l} H} \left| \left(\bar{l}_{Lr}^j e_{Rp} \right) \tau^{Ij} H_i B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\tau^{I_3} \right)_{i_6}^{i_4} \left| \quad (4.432)$$

$$\mathcal{O}_{C_L B_L W_L d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{aj} d_{Rpa} \right) \tau^{Ij} H_i B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_6}^{a_5} \left(\tau^{I_3} \right)_{i_6}^{i_4} \left| \quad (4.433)$$

$$\mathcal{O}_{C_L W_L^2 \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_6} \delta^{I_2 I_3} \epsilon_{i_4 i_5} \left| \quad (4.434)$$

$$\mathcal{O}_{C_L W_L^2 e_R \bar{l} H} \left| \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta^{I_2 I_3} \left| \quad (4.435)$$

$$\mathcal{O}_{C_L W_L^2 d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \delta^{I_2 I_3} \left| \quad (4.436)$$

$$\mathcal{O}_{C_L B_L G_L \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \lambda^{Ab} \epsilon_{ij} H^{\dagger i} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon_{i_4 i_5} \left(\lambda^{A_3} \right)_{a_5}^{a_6} \left| \quad (4.437)$$

$$\mathcal{O}_{C_L B_L G_L d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{bi} d_{Rpa} \right) \lambda^{Aa} H_i B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \left(\lambda^{A_3} \right)_{a_6}^{a_5} \left| \quad (4.438)$$

$$\mathcal{O}_{C_L G_L W_L \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \lambda^{Ab} \tau^{Ik} \epsilon_{jk} H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \epsilon_{i_5 k} \left(\tau^{I_3} \right)_{i_4}^k \left(\lambda^{A_2} \right)_{a_5}^{a_6} \left| \quad (4.439)$$

$$\mathcal{O}_{C_L G_L W_L d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{bj} d_{Rpa} \right) \lambda^{Aa} \tau^{Ij} H_i C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} W_L^{I\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_6}^{a_5} \left(\tau^{I_3} \right)_{i_6}^{i_4} \left| \quad (4.440)$$

$$\mathcal{O}_{C_L G_L^2 \bar{q} u_R H^\dagger}^{(1,2)} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_6} \delta^{A_2 A_3} \epsilon_{i_4 i_5} \left| \quad (4.441)$$

$$\left(\bar{q}_{Lp}^{aj} u_{Rrb} \right) d^{ABC} \lambda^C{}_a \epsilon_{ij} H^{\dagger i} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_4 i_5} d^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_6} \left| \quad (4.441)$$

$$\mathcal{O}_{C_L G_L^2 e_R \bar{l} H} \left| \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta^{A_2 A_3} \left| \quad (4.442)$$

$$\mathcal{O}_{C_L G_L^2 d_R \bar{q} H}^{(1,2)} \left| \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \delta^{A_2 A_3} \left| \quad (4.443)$$

$$\left(\bar{q}_{Lr}^{bi} d_{Rpa} \right) d^{ABC} \lambda^C{}_b H_i C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} d^{CA_2 A_3} \left(\lambda^C \right)_{a_6}^{a_5} \left| \quad (4.443)$$

Class $C_L^2 \psi^2 \bar{\psi}^2$: 21 types

$$\mathcal{O}_{C_L^2 \bar{e}_R^2 e_R^2} \left| \mathcal{Y} \left[\overline{\square \Gamma}, \square \Gamma \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta e_{Rs} \right) \left(\bar{e}_{Rr} \gamma^\eta e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \left| \quad (4.444)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R \bar{l} l} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta e_{Rs} \right) \left(\bar{l}_{Lt}^i \gamma^\eta l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \left| \quad (4.445)$$

$$\mathcal{O}_{C_L^2 d_R \bar{e}_R l \bar{q}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta d_{Rsa} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\eta l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \left| \quad (4.446)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R \bar{l} l} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{l}_{Lt}^i \gamma^\eta l_{Lri} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_5} \left| \quad (4.447)$$

$$\mathcal{O}_{C_L^2 \bar{l} \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma_\eta l_{Lpi} \right) \left(\bar{u}_{Rr}^a \gamma^\eta u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_6} \quad (4.448)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R q \bar{q}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta e_{Rs} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\eta q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_4} \quad (4.449)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R e_R \bar{l} q} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta e_{Rs} \right) \left(\bar{l}_{Lt}^i \gamma^\eta q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_4} \quad (4.450)$$

$$\mathcal{O}_{C_L^2 l^2 \bar{l}^2} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma_\eta l_{Lpi} \right) \left(\bar{l}_{Lt}^j \gamma^\eta l_{Lrj} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \quad (4.451)$$

$$\left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma_\eta l_{Lpi} \right) \left(\bar{l}_{Lt}^j \gamma^\eta l_{Lrj} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[1, 1], [1, 1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \quad (4.451)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R \bar{e}_R e_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{e}_{Rr} \gamma^\eta e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (4.452)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta e_{Rs} \right) \left(\bar{u}_{Rr}^a \gamma^\eta u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_6} \quad (4.453)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R^2 d_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{d}_{Rr}^b \gamma^\eta d_{Rtb} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (4.454)$$

$$\left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{d}_{Rr}^b \gamma^\eta d_{Rtb} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[1, 1], [1, 1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (4.454)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\eta u_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (4.455)$$

$$\left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsb} \right) \left(\bar{u}_{Rr}^b \gamma^\eta u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_6} \delta_{a_4}^{a_5} \quad (4.455)$$

$$\mathcal{O}_{C_L^2 \bar{u}_R^2 u_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{r} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \gamma_\eta u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\eta u_{Rtb} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (4.456)$$

$$\left| \mathcal{Y} \left[\begin{smallmatrix} \overline{p} & \overline{s} \\ \overline{r} & \overline{t} \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \gamma_\eta u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\eta u_{Rtb} \right) \right| \mathcal{C}_{f_3 f_4, f_5 f_6}^{[1, 1], [1, 1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (4.456)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R \bar{q}^2 \bar{u}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{r} & \overline{s} \end{smallmatrix} \right] \epsilon_{abc} \epsilon_{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \gamma_\eta C \bar{q}_{Ls}^{bi} \right) \left(\bar{u}_{Rr}^a \gamma^\eta C \bar{q}_{Lt}^{cj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{i_5 i_6} \epsilon_{a_4 a_5 a_6} \quad (4.457)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{l} \bar{q} \bar{u}_R} \left| \epsilon_{abc} \epsilon_{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta C \bar{l}_{Ls}^i \right) \left(\bar{u}_{Rr}^b \gamma^\eta C \bar{q}_{Lt}^{cj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{i_5 i_6} \epsilon_{a_3 a_4 a_6} \quad (4.458)$$

$$\mathcal{O}_{C_L^2 d_R l q u_R} \left| \epsilon^{abc} \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(l_{Lpi} C \gamma_\eta d_{Rsb} \right) \left(q_{Lraj} C \gamma^\eta u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{i_3 i_4} \epsilon^{a_4 a_5 a_6} \quad (4.459)$$

$$\mathcal{O}_{C_L^2 e_R q^2 u_R} \left| \mathcal{Y} \left[\begin{smallmatrix} \overline{r} & \overline{s} \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ij} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(q_{Lpai} C \gamma_\eta e_{Rs} \right) \left(q_{Lrbj} C \gamma^\eta u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{i_3 i_4} \epsilon^{a_3 a_4 a_6} \quad (4.460)$$

$$\mathcal{O}_{C_L^2 \bar{l} \bar{q} \bar{q}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^i \gamma_\eta l_{Lpi} \right) \left(\bar{q}_{Lt}^{aj} \gamma^\eta q_{Lraj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_6}^{a_4} \quad (4.461)$$

$$\left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{l}_{Ls}^j \gamma_\eta l_{Lpi} \right) \left(\bar{q}_{Lt}^{ai} \gamma^\eta q_{Lraj} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_6}^{a_4} \quad (4.461)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R q \bar{q}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsa} \right) \left(\bar{q}_{Lt}^{bi} \gamma^\eta q_{Lrbi} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \quad (4.462)$$

$$\left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \gamma_\eta d_{Rsc} \right) \left(\bar{q}_{Lt}^{ci} \gamma^\eta q_{Lrai} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{a_3}^{a_4} \delta_{a_6}^{a_5} \quad (4.462)$$

$$\mathcal{O}_{C_L^2 q \bar{q} \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{q}_{Ls}^{ci} \gamma_\eta q_{Lpai} \right) \left(\bar{u}_{Rr}^a \gamma^\eta u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_3} \delta_{a_5}^{a_6} \quad (4.463)$$

$$\left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left(\bar{q}_{Ls}^{ai} \gamma_\eta q_{Lpai} \right) \left(\bar{u}_{Rr}^b \gamma^\eta u_{Rtb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{a_5}^{a_3} \delta_{a_4}^{a_6} \quad (4.463)$$

$$\begin{aligned}
 \mathcal{O}_{C_L^2 q^2 \bar{q}^2}^{(1\sim 4)} & \left| \begin{array}{l} \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right], \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix}\right]} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ai} \gamma_\eta q_{Lpai}) \left(\bar{q}_{Lt}^{bj} \gamma^\eta q_{Lrbj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right], \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix}\right]} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{q}_{Ls}^{aj} \gamma_\eta q_{Lpai}) \left(\bar{q}_{Lt}^{bi} \gamma^\eta q_{Lrbj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right], \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix}\right]} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{q}_{Ls}^{ai} \gamma_\eta q_{Lpai}) \left(\bar{q}_{Lt}^{bj} \gamma^\eta q_{Lrbj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right], \left[\begin{smallmatrix} s & t \\ \bar{s} & \bar{t} \end{smallmatrix}\right]} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{q}_{Ls}^{aj} \gamma_\eta q_{Lpai}) \left(\bar{q}_{Lt}^{bi} \gamma^\eta q_{Lrbj} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2],[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \\ \mathcal{C}_{f_3 f_4, f_5 f_6}^{[2],[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \\ \mathcal{C}_{f_3 f_4, f_5 f_6}^{[1,1],[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \\ \mathcal{C}_{f_3 f_4, f_5 f_6}^{[1,1],[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_5}^{a_3} \delta_{a_6}^{a_4} \end{array} \quad (4.464)
 \end{aligned}$$

Class $C_L^3 \bar{\psi}^2 \phi$: 3 types

$$\mathcal{O}_{C_L^3 \bar{q} u_R H^\dagger} \left| \left(\bar{q}_{Lp}^{aj} u_{Rra} \right) \epsilon_{ij} H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{a_5}^{a_6} \epsilon_{i_4 i_5} \quad (4.465)$$

$$\mathcal{O}_{C_L^3 \epsilon_R \bar{l} H} \left| \left(\bar{l}_{Lr}^i e_{Rp} \right) H_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{i_6}^{i_4} \quad (4.466)$$

$$\mathcal{O}_{C_L^3 d_R \bar{q} H} \left| \left(\bar{q}_{Lr}^{ai} d_{Rpa} \right) H_i C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \mathcal{C}_{f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{i_6}^{i_4} \delta_{a_6}^{a_5} \quad (4.467)$$

Class $C_L \psi^3 \bar{\psi} \phi D$: 23 types

$$\mathcal{O}_{C_L \bar{e}_R^2 e_R l H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} l_{Lsi} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} l_{Lsi} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} p & r \\ \bar{p} & \bar{r} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Rp} \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} (D_\mu l_{Lsi}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2 f_3, f_4, f_6}^{[2]} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_2 f_3, f_4, f_6}^{[1,1]} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_2 f_3, f_4, f_6}^{[1,1]} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_4} \end{array} \quad (4.468)$$

$$\mathcal{O}_{C_L \bar{e}_R l^2 \bar{l} H^\dagger D}^{(1\sim 6)} \left| \begin{array}{l} \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C (D_\mu \bar{e}_{Rp}) \right) \left(l_{Lri} C \sigma^{\nu\lambda} l_{Lsj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C \bar{e}_{Rp} \right) \left((D_\mu l_{Lri}) C \sigma^{\nu\lambda} l_{Lsj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C \bar{e}_{Rp} \right) \left(l_{Lri} C \sigma^{\nu\lambda} (D_\mu l_{Lsj}) \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C (D_\mu \bar{e}_{Rp}) \right) \left(l_{Lri} C \sigma^{\nu\lambda} l_{Lsj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C \bar{e}_{Rp} \right) \left((D_\mu l_{Lri}) C \sigma^{\nu\lambda} l_{Lsj} \right) \\ \mathcal{Y}_{\left[\begin{smallmatrix} r & s \\ \bar{r} & \bar{s} \end{smallmatrix}\right]} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{l}_{Lt}^j \gamma^\rho C \bar{e}_{Rp} \right) \left(l_{Lri} C \sigma^{\nu\lambda} (D_\mu l_{Lsj}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3 f_4, f_6}^{[2]} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_2, f_3 f_4, f_6}^{[2]} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_2, f_3 f_4, f_6}^{[2]} [56] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_2, f_3 f_4, f_6}^{[1,1]} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_2, f_3 f_4, f_6}^{[1,1]} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_2, f_3 f_4, f_6}^{[1,1]} [56] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \end{array} \quad (4.469)$$

$$\mathcal{O}_{C_L \bar{d}_R d_R \bar{e}_R l H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rta} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} l_{Lsi} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rta} \right) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} l_{Lsi} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rta} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} (D_\mu l_{Lsi}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_6} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_2}^{a_6} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_3} \delta_{a_2}^{a_6} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [56] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{a_2}^{a_6} \end{array} \quad (4.470)$$

$$\mathcal{O}_{C_L \bar{e}_R l \bar{u}_R u_R H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{e}_{Rp}) \gamma^\rho u_{Rta} \right) \left(\bar{u}_{Rs}^a \sigma^{\nu\lambda} l_{Lri} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Rp} \gamma^\rho u_{Rta} \right) \left(\bar{u}_{Rs}^a \sigma^{\nu\lambda} (D_\mu l_{Lri}) \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Rp} \gamma^\rho u_{Rta} \right) \left((D_\mu \bar{u}_{Rs}^a) \sigma^{\nu\lambda} l_{Lri} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_6} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_6} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_3} \delta_{a_4}^{a_6} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [56] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{a_4}^{a_6} \end{array} \quad (4.471)$$

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R e_R q H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{d}_{Rp}^a) \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} q_{Lsai} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rt} \right) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} q_{Lsai} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} (D_\mu q_{Lsai}) \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_6} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{i_5}^{i_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_2, f_3, f_4, f_6} [56] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{a_2}^{a_4} \end{array} \quad (4.472)$$

$$\begin{aligned}
 \mathcal{O}_{C_L B_L \bar{l} H H^\dagger D}^{(1\sim 6)} & \left| \begin{array}{l} H_j H^{\dagger i} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ H_j H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (\bar{l}_{Lr}^j \gamma^\rho (D_\mu l_{Lpi})) \\ H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_j) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ H_j H^{\dagger j} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \\ H_j H^{\dagger j} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (\bar{l}_{Lr}^i \gamma^\rho (D_\mu l_{Lpi})) \\ H^{\dagger j} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_j) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \end{array} \quad (4.492)
 \end{aligned}$$

$$\mathcal{O}_{C_L B_L \bar{d}_R u_R H^\dagger D} \left| \epsilon_{ij} H^{\dagger j} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H^{\dagger i}) (\bar{d}_{Rp}^a \gamma^\rho u_{Rra}) \right| \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} \epsilon_{i_4 i_5} \quad (4.493)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R d_R H H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} H_i H^{\dagger i} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \\ H_i H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rra}) \\ H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_i) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \end{array} \quad (4.494)$$

$$\mathcal{O}_{C_L B_L \bar{u}_R u_R H H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} H_i H^{\dagger i} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \\ H_i H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\rho u_{Rra}) \\ H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_i) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \end{array} \quad (4.495)$$

$$\mathcal{O}_{C_L B_L d_R \bar{u}_R H^2 D} \left| \epsilon^{ij} H_j B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_i) (\bar{u}_{Rp}^a \gamma^\rho d_{Rra}) \right| \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} \epsilon^{i_4 i_5} \quad (4.496)$$

$$\mathcal{O}_{C_L B_L q \bar{q} H H^\dagger D}^{(1\sim 6)} \left| \begin{array}{l} H_j H^{\dagger i} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ H_j H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu q_{Lpai})) \\ H^{\dagger i} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ H_j H^{\dagger j} C_{L\nu\lambda\rho}{}^\mu (D_\mu B_L^{\nu\lambda}) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \\ H_j H^{\dagger j} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu q_{Lpai})) \\ H^{\dagger j} B_L^{\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \end{array} \quad (4.497)$$

$$\mathcal{O}_{C_L W_L \bar{e}_R e_R H H^\dagger D}^{(1\sim 3)} \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} C_{L\nu\lambda\rho}{}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \\ \tau_j^{Ii} H_i H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rr}) \\ \tau_j^{Ii} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}{}^\mu (D_\mu H_i) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\tau^{I_2})_{i_5}^{i_4} \end{array} \quad (4.498)$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L \bar{l} H H^\dagger D}^{(1\sim 9)} & \left| \begin{array}{l} \tau_k^{Ij} H_j H^{\dagger k} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \\ \tau_k^{Ij} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{l}_{Lr}^i \gamma^\rho (D_\mu l_{Lpi})) \\ \tau_k^{Ij} H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{l}_{Lr}^i \gamma^\rho l_{Lpi}) \\ \tau_k^{Ii} H_j H^{\dagger k} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ \tau_k^{Ii} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{l}_{Lr}^j \gamma^\rho (D_\mu l_{Lpi})) \\ \tau_k^{Ii} H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{l}_{Lr}^j \gamma^\rho l_{Lpi}) \\ \tau_l^{Ii} H_j H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{l}_{Lr}^l \gamma^\rho l_{Lpi}) \\ \tau_l^{Ii} H_j H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{l}_{Lr}^l \gamma^\rho (D_\mu l_{Lpi})) \\ \tau_l^{Ii} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{l}_{Lr}^l \gamma^\rho l_{Lpi}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_4} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} (\tau^{I_2})_{i_6}^{i_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} (\tau^{I_2})_{i_6}^{i_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} (\tau^{I_2})_{i_6}^{i_3} \end{array} \right| \\
 & \quad (4.499)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L \bar{d}_R u_R H^{\dagger 2} D}^{(1,2)} & \left| \begin{array}{l} \tau_i^{Ik} \epsilon_{jk} H^{\dagger i} H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{d}_{Rp}^a \gamma^\rho u_{Rra}) \\ \tau_i^{Ik} \epsilon_{jk} H^{\dagger i} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_6} \epsilon_{i_5 k} (\tau^{I_2})_{i_4}^k \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} \epsilon_{i_5 k} (\tau^{I_2})_{i_4}^k \end{array} \right| \\
 & \quad (4.500)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L \bar{d}_R d_R H H^\dagger D}^{(1\sim 3)} & \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \\ \tau_j^{Ii} H_i H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rra}) \\ \tau_j^{Ii} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_i) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \end{array} \right| \\
 & \quad (4.501)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L \bar{u}_R u_R H H^\dagger D}^{(1\sim 3)} & \left| \begin{array}{l} \tau_j^{Ii} H_i H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \\ \tau_j^{Ii} H_i H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\rho u_{Rra}) \\ \tau_j^{Ii} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_i) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_6} (\tau^{I_2})_{i_5}^{i_4} \end{array} \right| \\
 & \quad (4.502)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L d_R \bar{u}_R H^2 D}^{(1,2)} & \left| \begin{array}{l} \tau_k^{Ii} \epsilon^{jk} H_i H_j C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{u}_{Rp}^a \gamma^\rho d_{Rra}) \\ \tau_k^{Ii} \epsilon^{jk} H_i H_j W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_6} \epsilon^{i_5 k} (\tau^{I_2})_k^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{a_3}^{a_6} \epsilon^{i_5 k} (\tau^{I_2})_k^{i_4} \end{array} \right| \\
 & \quad (4.503)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L W_L q \bar{q} H H^\dagger D}^{(1\sim 9)} & \left| \begin{array}{l} \tau_k^{Ij} H_j H^{\dagger k} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \\ \tau_k^{Ij} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{q}_{Lr}^{ai} \gamma^\rho (D_\mu q_{Lpai})) \\ \tau_k^{Ij} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{ai} \gamma^\rho q_{Lpai}) \\ \tau_k^{Ii} H_j H^{\dagger k} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ \tau_k^{Ii} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{q}_{Lr}^{aj} \gamma^\rho (D_\mu q_{Lpai})) \\ \tau_k^{Ii} H_j H^{\dagger k} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{aj} \gamma^\rho q_{Lpai}) \\ \tau_l^{Ii} H_j H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu W_L^{I\nu\lambda}) (\bar{q}_{Lr}^{al} \gamma^\rho q_{Lpai}) \\ \tau_l^{Ii} H_j H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{q}_{Lr}^{al} \gamma^\rho (D_\mu q_{Lpai})) \\ \tau_l^{Ii} H^{\dagger j} W_L^{I\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{al} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_3} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_5}^{i_3} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_6}^{i_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_6}^{i_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} \delta_{a_6}^{a_3} (\tau^{I_2})_{i_6}^{i_3} \end{array} \quad (4.504)
 \end{aligned}$$

$$\mathcal{O}_{C_L G_L \bar{d}_R u_R H^{\dagger 2} D} \left| \lambda_a^{Ab} \epsilon_{ij} H^{\dagger j} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H^{\dagger i}) (\bar{d}_{Rp}^a \gamma^\rho u_{Rrb}) \right| \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \epsilon_{i_4 i_5} (\lambda^{A_2})_{a_3}^{a_6} \quad (4.505)$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L \bar{d}_R d_R H H^\dagger D}^{(1\sim 3)} & \left| \begin{array}{l} \lambda_a^{Ab} H_i H^{\dagger i} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\nu\lambda}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \\ \lambda_a^{Ab} H_i H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rrb}) \\ \lambda_a^{Ab} H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_i) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \end{array} \quad (4.506)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L \bar{u}_R u_R H H^\dagger D}^{(1\sim 3)} & \left| \begin{array}{l} \lambda_a^{Ab} H_i H^{\dagger i} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\nu\lambda}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \\ \lambda_a^{Ab} H_i H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu ((D_\mu \bar{u}_{Rp}^a) \gamma^\rho u_{Rrb}) \\ \lambda_a^{Ab} H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_i) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_3}^{a_6} \end{array} \quad (4.507)
 \end{aligned}$$

$$\mathcal{O}_{C_L G_L d_R \bar{u}_R H^2 D} \left| \lambda_a^{Ab} \epsilon^{ij} H_j G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_i) (\bar{u}_{Rp}^a \gamma^\rho d_{Rrb}) \right| \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \epsilon^{i_4 i_5} (\lambda^{A_2})_{a_3}^{a_6} \quad (4.508)$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L q \bar{q} H H^\dagger D}^{(1\sim 6)} & \left| \begin{array}{l} \lambda_b^{Aa} H_j H^{\dagger i} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\nu\lambda}) (\bar{q}_{Lr}^{bj} \gamma^\rho q_{Lpai}) \\ \lambda_b^{Aa} H_j H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{q}_{Lr}^{bj} \gamma^\rho (D_\mu q_{Lpai})) \\ \lambda_b^{Aa} H^{\dagger i} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{bj} \gamma^\rho q_{Lpai}) \\ \lambda_b^{Aa} H_j H^{\dagger j} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\nu\lambda}) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \\ \lambda_b^{Aa} H_j H^{\dagger j} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (\bar{q}_{Lr}^{bi} \gamma^\rho (D_\mu q_{Lpai})) \\ \lambda_b^{Aa} H^{\dagger j} G_L^{A\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu H_j) (\bar{q}_{Lr}^{bi} \gamma^\rho q_{Lpai}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \\ \mathcal{C}_{f_3, f_6} [36] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \\ \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} (\lambda^{A_2})_{a_6}^{a_3} \end{array} \quad (4.509)
 \end{aligned}$$

Class $C_L^2 \psi \bar{\psi} \phi^2 D$: 7 types

$$\begin{aligned}
 \mathcal{O}_{C_L^2 \bar{e}_R e_R H H^\dagger D}^{(1,2)} & \left| \begin{array}{l} H_i H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ H^{\dagger i} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_5}^{i_4} \\ \mathcal{C}_{f_3, f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \end{array} \quad (4.510)
 \end{aligned}$$

$$\mathcal{O}_{C_L^2 \bar{l} H H^\dagger D}^{(1\sim 4)} \left| \begin{array}{l} H_j H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{l}_{Lr}^j \gamma^\mu l_{Lpi} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_j) \left(\bar{l}_{Lr}^j \gamma^\mu l_{Lpi} \right) \\ H_j H^{\dagger j} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{l}_{Lr}^i \gamma^\mu l_{Lpi} \right) \\ H^{\dagger j} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_j) \left(\bar{l}_{Lr}^i \gamma^\mu l_{Lpi} \right) \end{array} \right| \begin{array}{l} C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \end{array} \quad (4.511)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R u_R H^\dagger D} \left| \epsilon_{ij} H^{\dagger j} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H^{\dagger i}) \left(\bar{d}_{Rp}^a \gamma^\mu u_{Rra} \right) \right| C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{a_3}^{a_6} \epsilon_{i_4 i_5} \quad (4.512)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R H H^\dagger D}^{(1,2)} \left| \begin{array}{l} H_i H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Rp}^a \gamma^\mu d_{Rra} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) \left(\bar{d}_{Rp}^a \gamma^\mu d_{Rra} \right) \end{array} \right| \begin{array}{l} C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \end{array} \quad (4.513)$$

$$\mathcal{O}_{C_L^2 \bar{u}_R u_R H H^\dagger D}^{(1,2)} \left| \begin{array}{l} H_i H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{u}_{Rp}^a \gamma^\mu u_{Rra} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) \left(\bar{u}_{Rp}^a \gamma^\mu u_{Rra} \right) \end{array} \right| \begin{array}{l} C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_4} \delta_{a_3}^{a_6} \end{array} \quad (4.514)$$

$$\mathcal{O}_{C_L^2 d_R \bar{u}_R H^2 D} \left| \epsilon^{ij} H_j C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) \left(\bar{u}_{Rp}^a \gamma^\mu d_{Rra} \right) \right| C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{a_3}^{a_6} \epsilon^{i_4 i_5} \quad (4.515)$$

$$\mathcal{O}_{C_L^2 q \bar{q} H H^\dagger D}^{(1\sim 4)} \left| \begin{array}{l} H_j H^{\dagger i} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{q}_{Lr}^{aj} \gamma^\mu q_{Lpai} \right) \\ H^{\dagger i} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_j) \left(\bar{q}_{Lr}^{aj} \gamma^\mu q_{Lpai} \right) \\ H_j H^{\dagger j} C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{q}_{Lr}^{ai} \gamma^\mu q_{Lpai} \right) \\ H^{\dagger j} C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_j) \left(\bar{q}_{Lr}^{ai} \gamma^\mu q_{Lpai} \right) \end{array} \right| \begin{array}{l} C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_6}^{a_3} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_6}^{a_3} \\ C_{f_3,f_6} [56] \langle 12 \rangle^4 \langle 35 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_6}^{a_3} \\ C_{f_3,f_6} [46] \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_3} \delta_{i_5}^{i_4} \delta_{a_6}^{a_3} \end{array} \quad (4.516)$$

Class $C_L \psi^2 \phi^3 D^2$: 3 types

$$\mathcal{O}_{C_L \bar{e}_R l H H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} H_j H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} (D_\nu l_{Lri}) \right) \\ H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_j) \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} l_{Lri} \right) \\ H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_j) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} (D_\mu l_{Lri}) \right) \\ H_j H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} l_{Lri} \right) \\ H_j H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} (D_\mu l_{Lri}) \right) \\ H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\mu H_j) \left(D_\nu H^{\dagger i} \right) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} l_{Lri} \right) \end{array} \right| \begin{array}{l} C_{f_2,f_3} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_2,f_3} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_2,f_3} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_2,f_3} [56] \langle 12 \rangle \langle 13 \rangle \langle 15 \rangle \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_2,f_3} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ C_{f_2,f_3} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \end{array} \quad (4.517)$$

$$\mathcal{O}_{C_L \bar{d}_R q H H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} H_j H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\lambda\rho} (D_\nu q_{Lrai}) \right) \\ H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_j) \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\lambda\rho} q_{Lrai} \right) \\ H^{\dagger i} H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\nu H_j) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} (D_\mu q_{Lrai}) \right) \\ H_j H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left((D_\mu \bar{d}_{Rp}^a) \sigma^{\lambda\rho} q_{Lrai} \right) \\ H_j H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} \left(D_\nu H^{\dagger i} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} (D_\mu q_{Lrai}) \right) \\ H^{\dagger j} C_{L\lambda\rho}^{\nu\mu} (D_\mu H_j) \left(D_\nu H^{\dagger i} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrai} \right) \end{array} \right| \begin{array}{l} C_{f_2,f_3} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \\ C_{f_2,f_3} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \\ C_{f_2,f_3} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \\ C_{f_2,f_3} [56] \langle 12 \rangle \langle 13 \rangle \langle 15 \rangle \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \\ C_{f_2,f_3} [46] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \\ C_{f_2,f_3} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \delta_{a_2}^{a_3} \end{array} \quad (4.518)$$

$$\mathcal{O}_{C_L q \bar{u}_R H^2 H^\dagger D^2}^{(1\sim 6)} \left| \begin{array}{l} \epsilon^{jk} H_k H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_j) \left(\bar{u}_{Rr}^a \sigma^{\lambda\rho} (D_\mu q_{Lpai}) \right) \\ \epsilon^{jk} H_k H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_j) \left((D_\mu \bar{u}_{Rr}^a) \sigma^{\lambda\rho} q_{Lpai} \right) \\ \epsilon^{jk} H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_j) (D_\nu H_k) \left(\bar{u}_{Rr}^a \sigma^{\lambda\rho} q_{Lpai} \right) \\ \epsilon^{ij} H_j H_k H^\dagger{}^k C_{L\lambda\rho}{}^{\nu\mu} \left((D_\nu \bar{u}_{Rr}^a) \sigma^{\lambda\rho} (D_\mu q_{Lpai}) \right) \\ \epsilon^{ij} H_k H^\dagger{}^k C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_j) \left(\bar{u}_{Rr}^a \sigma^{\lambda\rho} (D_\mu q_{Lpai}) \right) \\ \epsilon^{ij} H_k H^\dagger{}^k C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_j) \left((D_\mu \bar{u}_{Rr}^a) \sigma^{\lambda\rho} q_{Lpai} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_6}^{i_2} \delta_{a_3}^{a_2} \epsilon^{i_5 i_4} \\ \mathcal{C}_{f_2, f_3} [56] \langle 12 \rangle \langle 13 \rangle \langle 15 \rangle \langle 16 \rangle \delta_{i_6}^{i_2} \delta_{a_3}^{a_2} \epsilon^{i_5 i_4} \\ \mathcal{C}_{f_2, f_3} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_2} \delta_{a_3}^{a_2} \epsilon^{i_5 i_4} \\ \mathcal{C}_{f_2, f_3} [36] \langle 12 \rangle \langle 13 \rangle^2 \langle 16 \rangle \delta_{i_6}^{i_5} \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \\ \mathcal{C}_{f_2, f_3} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \delta_{i_6}^{i_5} \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \\ \mathcal{C}_{f_2, f_3} [56] \langle 12 \rangle \langle 13 \rangle \langle 15 \rangle \langle 16 \rangle \delta_{i_6}^{i_5} \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \end{array} \quad (4.519)$$

Class $C_L F_L \phi^4 D^2$: 2 types

$$\mathcal{O}_{C_L B_L H^2 H^\dagger D^2}^{(1,2)} \left| \begin{array}{l} H_j H^\dagger{}^i H^\dagger{}^j C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) \left(D_\mu B_L^{\lambda\rho} \right) \\ H_j H^\dagger{}^j B_L^{\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_i) \left(D_\nu H^\dagger{}^i \right) \end{array} \right| \begin{array}{l} [46] \langle 12 \rangle^2 \langle 14 \rangle \langle 16 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \end{array} \quad (4.520)$$

$$\mathcal{O}_{C_L W_L H^2 H^\dagger D^2}^{(1\sim 5)} \left| \begin{array}{l} \tau_k^{Ij} H_j H^\dagger{}^i H^\dagger{}^k C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_i) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau_k^{Ij} H_i H^\dagger{}^i H^\dagger{}^k C_{L\lambda\rho}{}^{\nu\mu} (D_\nu H_j) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau_k^{Ij} H^\dagger{}^i H^\dagger{}^k W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_i) (D_\nu H_j) \\ \tau_k^{Ij} H_i H_j H^\dagger{}^i C_{L\lambda\rho}{}^{\nu\mu} \left(D_\nu H^\dagger{}^k \right) \left(D_\mu W_L^{I\lambda\rho} \right) \\ \tau_k^{Ij} H_j H^\dagger{}^i W_L^{I\lambda\rho} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu H_i) \left(D_\nu H^\dagger{}^k \right) \end{array} \right| \begin{array}{l} [56] \langle 12 \rangle^2 \langle 15 \rangle \langle 16 \rangle \delta_{i_6}^{i_3} \left(\tau^{I_2} \right)_{i_5}^{i_4} \\ [46] \langle 12 \rangle^2 \langle 14 \rangle \langle 16 \rangle \delta_{i_6}^{i_3} \left(\tau^{I_2} \right)_{i_5}^{i_4} \\ [45] \langle 12 \rangle^2 \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_3} \left(\tau^{I_2} \right)_{i_5}^{i_4} \\ [36] \langle 12 \rangle^2 \langle 13 \rangle \langle 16 \rangle \delta_{i_6}^{i_3} \left(\tau^{I_2} \right)_{i_5}^{i_4} \\ [34] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_3} \left(\tau^{I_2} \right)_{i_5}^{i_4} \end{array} \quad (4.521)$$

Class $C_L^2 \phi^4 D^2$: 1 types

$$\mathcal{O}_{C_L^2 H^2 H^\dagger D^2}^{(1\sim 4)} \left| \begin{array}{l} H_i H_j H^\dagger{}^i H^\dagger{}^j (D_\mu C_{L\nu\lambda\rho\eta}) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \\ H_j H^\dagger{}^i H^\dagger{}^j C_L^{\nu\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu H_i) \\ H^\dagger{}^i H^\dagger{}^j C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) (D^\mu H_j) \\ H_j H^\dagger{}^j C_{L\nu\lambda\rho\eta} C_L^{\nu\lambda\rho\eta} (D_\mu H_i) \left(D^\mu H^\dagger{}^i \right) \end{array} \right| \begin{array}{l} s_{56} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ s_{46} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ s_{45} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \\ s_{34} \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_6}^{i_4} \end{array} \quad (4.522)$$

Class $C_R^2 \psi^4$: 4 types

$$\mathcal{O}_{C_R^2 \bar{d}_R \bar{e}_R \bar{u}_R^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} \bar{s} & \bar{t} \end{smallmatrix} \right] \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma_{\eta\xi} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma_{\eta\xi} C \bar{u}_{Rt}^c \right) \\ \mathcal{Y} \left[\begin{smallmatrix} \bar{s} & \bar{t} \end{smallmatrix} \right] \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{d}_{Rp}^a C \bar{e}_{Rr} \bar{u}_{Rs}^b C \bar{u}_{Rt}^c \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon_{a_1 a_3 a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon_{a_1 a_3 a_4} \end{array} \quad (4.523)$$

$$\mathcal{O}_{C_R^2 \bar{e}_R l q \bar{u}_R}^{(1,2)} \left| \begin{array}{l} (\bar{e}_{Rp} l_{Rr} i) (\bar{u}_{Rt}^a q_{Lsaj}) \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma_{\eta\xi} l_{Rr} i) \left(\bar{u}_{Rt}^a \sigma_{\eta\xi} q_{Lsaj} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_4}^{a_3} \epsilon^{i_2 i_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_4}^{a_3} \epsilon^{i_2 i_3} \end{array} \quad (4.524)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R q^2 \bar{u}_R}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} \bar{r} & \bar{s} \end{smallmatrix} \right] \left(\bar{d}_{Rp}^a q_{Lrbi} \right) \left(\bar{u}_{Rt}^b q_{Lsaj} \right) \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ \mathcal{Y} \left[\begin{smallmatrix} \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma_{\eta\xi} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma_{\eta\xi} q_{Lsaj} \right) \\ \mathcal{Y} \left[\begin{smallmatrix} \bar{r} & \bar{s} \end{smallmatrix} \right] \left(\bar{d}_{Rp}^a q_{Lrbi} \right) \left(\bar{u}_{Rt}^b q_{Lsaj} \right) \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ \mathcal{Y} \left[\begin{smallmatrix} \bar{r} & \bar{s} \end{smallmatrix} \right] \epsilon^{ij} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma_{\eta\xi} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma_{\eta\xi} q_{Lsaj} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_4}^{a_2} \epsilon^{i_2 i_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_4}^{a_2} \epsilon^{i_2 i_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_4}^{a_2} \epsilon^{i_2 i_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_4}^{a_2} \epsilon^{i_2 i_3} \end{array} \quad (4.525)$$

$$\mathcal{O}_{C_R^2 l q^3}^{(1\sim 3)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s \\ t & t \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} l_{Lpi} C_{QLraj} q_{Lsbk} C_{QLtcl} \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ t & t \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} l_{Lpi} C_{QLraj} q_{Lsbk} C_{QLtcl} \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ t & t \end{smallmatrix} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jl} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} l_{Lpi} C_{QLraj} q_{Lsbk} C_{QLtcl} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2 f_3 f_4}^{[3]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon^{i_1 i_3} \epsilon^{i_2 i_4} \epsilon^{a_2 a_3 a_4} \\ \mathcal{C}_{f_1, f_2 f_3 f_4}^{[2,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon^{i_1 i_3} \epsilon^{i_2 i_4} \epsilon^{a_2 a_3 a_4} \\ \mathcal{C}_{f_1, f_2 f_3 f_4}^{[1,1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon^{i_1 i_3} \epsilon^{i_2 i_4} \epsilon^{a_2 a_3 a_4} \end{array} \quad (4.526)$$

Class $C_R^2 F_L \psi^2 \phi$: 8 types

$$\mathcal{O}_{C_R^2 B_L \bar{e}_R l H^\dagger} \left| H^{\dagger i} B_L \eta^\xi C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\eta\xi} l_{Lri} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{i_4}^{i_3} \quad (4.527)$$

$$\mathcal{O}_{C_R^2 B_L \bar{d}_R q H^\dagger} \left| H^{\dagger i} B_L \eta^\xi C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{i_4}^{i_3} \delta_{a_2}^{a_3} \quad (4.528)$$

$$\mathcal{O}_{C_R^2 B_L q \bar{u}_R H} \left| \epsilon^{ij} H_j B_L \eta^\xi C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{a_3}^{a_2} \epsilon^{i_2 i_4} \quad (4.529)$$

$$\mathcal{O}_{C_R^2 W_L \bar{e}_R l H^\dagger} \left| \tau_j^{Ii} H^{\dagger j} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I \left(\bar{e}_{Rp} \sigma^{\eta\xi} l_{Lri} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \left(\tau_{i_4}^{I1} \right)^{i_3} \quad (4.530)$$

$$\mathcal{O}_{C_R^2 W_L \bar{d}_R q H^\dagger} \left| \tau_j^{Ii} H^{\dagger j} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrai} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{a_2}^{a_3} \left(\tau_{i_4}^{I1} \right)^{i_3} \quad (4.531)$$

$$\mathcal{O}_{C_R^2 W_L q \bar{u}_R H} \left| \tau_k^{Ii} \epsilon^{jk} H_j C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I \left(\bar{u}_{Rr}^a \sigma^{\eta\xi} q_{Lpai} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{a_3}^{a_2} \epsilon^{i_4 k} \left(\tau_k^{I1} \right)^{i_2} \quad (4.532)$$

$$\mathcal{O}_{C_R^2 G_L \bar{d}_R q H^\dagger} \left| \lambda_a^{Ab} H^{\dagger i} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} q_{Lrbi} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \delta_{i_4}^{i_3} \left(\lambda_{a_2}^{A1} \right)^{a_3} \quad (4.533)$$

$$\mathcal{O}_{C_R^2 G_L q \bar{u}_R H} \left| \lambda_b^{Aa} \epsilon^{ij} H_j C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A \left(\bar{u}_{Rr}^b \sigma^{\eta\xi} q_{Lpai} \right) \right| \mathcal{C}_{f_2, f_3} [56]^4 \langle 12 \rangle \langle 13 \rangle \epsilon^{i_2 i_4} \left(\lambda_{a_3}^{A1} \right)^{a_2} \quad (4.534)$$

Class $C_R^2 F_L^2 \phi^2$: 4 types

$$\mathcal{O}_{C_R^2 B_L^2 H H^\dagger} \left| H_i H^{\dagger i} B_L \eta^\xi B_L^\eta C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \right| [56]^4 \langle 12 \rangle^2 \delta_{i_4}^{i_3} \quad (4.535)$$

$$\mathcal{O}_{C_R^2 B_L W_L H H^\dagger} \left| \tau_j^{Ii} H_i H^{\dagger j} B_L \eta^\xi C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I \right| [56]^4 \langle 12 \rangle^2 \left(\tau_{i_4}^{I2} \right)^{i_3} \quad (4.536)$$

$$\mathcal{O}_{C_R^2 W_L^2 H H^\dagger} \left| H_i H^{\dagger i} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} W_{L\eta\xi}^I W_{L\eta\xi}^I \right| [56]^4 \langle 12 \rangle^2 \delta_{i_4}^{i_3} \delta_{I_1 I_2} \quad (4.537)$$

$$\mathcal{O}_{C_R^2 G_L^2 H H^\dagger} \left| H_i H^{\dagger i} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A G_{L\eta\xi}^A \right| [56]^4 \langle 12 \rangle^2 \delta_{i_4}^{i_3} \delta^{A_1 A_2} \quad (4.538)$$

Class $C_L^2 C_R^2 \phi^2$: 1 types

$$\mathcal{O}_{C_L^2 C_R^2 H H^\dagger} \left| H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} \right| [56]^4 \langle 12 \rangle^4 \delta_{i_4}^{i_3} \quad (4.539)$$

Class $C_L \psi^4 \phi^2$: 8 types

$$\mathcal{O}_{C_L \bar{e}_R^2 l^2 H^{\dagger 2}} \left| \mathcal{Y} \left[\begin{smallmatrix} p & s \\ r & t \end{smallmatrix} \right] H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} \left(l_{Lsi} C \sigma^{\mu\nu} l_{Ltj} \right) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \right| \mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[1,1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \quad (4.540)$$

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R \bar{u}_R^2 H H^\dagger} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ s & t \end{smallmatrix} \right] \epsilon_{abc} H_i H^{\dagger i} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma^{\mu\nu} C \bar{u}_{Rt}^c \right) \right| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_7}^{i_6} \epsilon_{a_2 a_4 a_5} \quad (4.541)$$

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R l q H^{\dagger 2}} \left| H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} (l_{Lsi} C \sigma^{\mu\nu} q_{Ltaj}) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \delta_{a_2}^{a_5} \quad (4.542)$$

$$\mathcal{O}_{C_L \bar{e}_R l q \bar{u}_R H H^{\dagger}}^{(1,2)} \left| \begin{array}{l} \epsilon^{jk} H_k H^{\dagger i} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} l_{Lri} \right) \left(\bar{u}_{Rt}^a \sigma^{\mu\nu} q_{Lsaj} \right) \\ \epsilon^{ij} H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} l_{Lri} \right) \left(\bar{u}_{Rt}^a \sigma^{\mu\nu} q_{Lsaj} \right) \end{array} \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_7}^{i_3} \delta_{a_5}^{a_4} \epsilon^{i_6 i_4} \quad (4.543)$$

$$\mathcal{O}_{C_L \bar{d}_R q^2 H^{\dagger 2}}^{(1,2)} \left| \mathcal{Y} \left[\begin{array}{c} \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \\ \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \end{array} \right] H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) (q_{Lsai} C \sigma^{\mu\nu} q_{Ltbj}) \right| \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2], [2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \delta_{a_2}^{a_4} \delta_{a_3}^{a_5} \quad (4.544)$$

$$\mathcal{O}_{C_L \bar{d}_R q^2 \bar{u}_R H H^{\dagger}}^{(1 \sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \\ \boxed{r} \boxed{s} \end{array} \right] \epsilon^{jk} H_k H^{\dagger i} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsaj} \right) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \\ \boxed{r} \boxed{s} \end{array} \right] \epsilon^{ij} H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsaj} \right) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \\ \boxed{r} \boxed{s} \end{array} \right] \epsilon^{jk} H_k H^{\dagger i} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsaj} \right) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \\ \boxed{r} \boxed{s} \end{array} \right] \epsilon^{ij} H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} q_{Lrbi} \right) \left(\bar{u}_{Rt}^b \sigma^{\mu\nu} q_{Lsaj} \right) \end{array} \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2], [2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_7}^{i_6} \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \epsilon^{i_6 i_4} \quad (4.545)$$

$$\mathcal{O}_{C_L q^2 \bar{u}_R^2 H^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{c} \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \\ \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \end{array} \right] \epsilon^{ik} \epsilon^{jl} H_k H_l C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rs}^a \sigma^{\mu\nu} C \bar{u}_{Rt}^b \right) (q_{Lpai} C \sigma^{\lambda\rho} q_{Lrbj}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \\ \boxed{p} \boxed{r}, \boxed{s} \boxed{t} \end{array} \right] \epsilon^{ik} \epsilon^{jl} H_k H_l C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rs}^a \sigma^{\mu\nu} C \bar{u}_{Rt}^b \right) (q_{Lpai} C \sigma^{\lambda\rho} q_{Lrbj}) \end{array} \right| \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2], [2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_4}^{a_2} \delta_{a_5}^{a_3} \epsilon^{i_3 i_6} \epsilon^{i_3 i_7} \quad (4.546)$$

$$\mathcal{O}_{C_L l q^3 H H^{\dagger}}^{(1 \sim 3)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \boxed{t} \\ \boxed{r} \boxed{s} \boxed{t} \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jm} H_m H^{\dagger l} C_{L\mu\nu\lambda\rho} (l_{Lpi} C \sigma^{\lambda\rho} q_{Lraj}) (q_{Lsbk} C \sigma^{\mu\nu} q_{Ltbl}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \boxed{t} \\ \boxed{r} \boxed{s} \boxed{t} \end{array} \right] \epsilon^{abc} \epsilon^{jm} \epsilon^{kl} H_m H^{\dagger i} C_{L\mu\nu\lambda\rho} (l_{Lpi} C \sigma^{\lambda\rho} q_{Lraj}) (q_{Lsbk} C \sigma^{\mu\nu} q_{Ltbl}) \\ \mathcal{Y} \left[\begin{array}{c} \boxed{r} \boxed{s} \boxed{t} \\ \boxed{r} \boxed{s} \boxed{t} \end{array} \right] \epsilon^{abc} \epsilon^{ik} \epsilon^{jm} H_m H^{\dagger l} C_{L\mu\nu\lambda\rho} (l_{Lpi} C \sigma^{\lambda\rho} q_{Lraj}) (q_{Lsbk} C \sigma^{\mu\nu} q_{Ltbl}) \end{array} \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[3], [2], [1], [1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{i_7}^{i_5} \delta_{i_7}^{i_4} \epsilon^{i_4 i_2} \epsilon^{i_6 i_3} \epsilon^{a_3 a_4 a_5} \quad (4.547)$$

Class $C_L F_L \psi^2 \phi^3$: 8 types

$$\mathcal{O}_{C_L B_L \bar{e}_R l H H^{\dagger 2}} \left| H_j H^{\dagger i} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \quad (4.548)$$

$$\mathcal{O}_{C_L B_L \bar{d}_R q H H^{\dagger 2}} \left| H_j H^{\dagger i} H^{\dagger j} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \delta_{a_3}^{a_4} \quad (4.549)$$

$$\mathcal{O}_{C_L B_L q \bar{u}_R H^2 H^{\dagger}} \left| \epsilon^{ij} H_j H_k H^{\dagger k} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} (\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_7}^{i_6} \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \quad (4.550)$$

$$\mathcal{O}_{C_L W_L \bar{e}_R l H H^{\dagger 2}}^{(1,2)} \left| \begin{array}{l} \tau^{Ij}_k H_j H^{\dagger i} H^{\dagger k} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri}) \\ \tau^{Ii}_k H_j H^{\dagger j} H^{\dagger k} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{e}_{Rp} \sigma^{\mu\nu} l_{Lri}) \end{array} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_7}^{i_4} \left(\tau^{I2} \right)_{i_6}^{i_5} \quad (4.551)$$

$$\mathcal{O}_{C_L W_L \bar{d}_R q H H^{\dagger 2}}^{(1,2)} \left| \begin{array}{l} \tau^{Ij}_k H_j H^{\dagger i} H^{\dagger k} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai}) \\ \tau^{Ii}_k H_j H^{\dagger j} H^{\dagger k} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrai}) \end{array} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_7}^{i_4} \delta_{a_3}^{a_4} \left(\tau^{I2} \right)_{i_6}^{i_5} \quad (4.552)$$

$$\mathcal{O}_{C_L W_L q \bar{u}_R H^2 H^{\dagger}}^{(1,2)} \left| \begin{array}{l} \tau^{Ij}_m \epsilon^{im} H_j H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai}) \\ \tau^{Ij}_l \epsilon^{ik} H_j H_k H^{\dagger l} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} (\bar{u}_{Rr}^a \sigma^{\mu\nu} q_{Lpai}) \end{array} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_7}^{i_6} \delta_{a_4}^{a_3} \epsilon^{i_3 m} \left(\tau^{I2} \right)_{i_7}^{i_5} \quad (4.553)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R q H H^{\dagger 2}} \left| \lambda^A_b H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} q_{Lrbi}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (4.554)$$

$$\mathcal{O}_{C_L G_L q \bar{u}_R H^2 H^\dagger} \left| \lambda^{Aa}_b \epsilon^{ij} H_j H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} \left(\bar{u}_{Rr}^b \sigma^{\mu\nu} q_{Lpai} \right) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{i_7}^{i_6} \epsilon^{i_3 i_5} \left(\lambda^{A_2} \right)_{a_4}^{a_3} \quad (4.555)$$

Class $C_L F_L^2 \phi^4$: 4 types

$$\mathcal{O}_{C_L B_L^2 H^2 H^\dagger} \left| H_i H_j H^{\dagger i} H^{\dagger j} B_L^{\lambda\rho} B_L^{\mu\nu} C_{L\mu\nu\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \quad (4.556)$$

$$\mathcal{O}_{C_L B_L W_L H^2 H^\dagger} \left| \tau_k^{Ij} H_i H_j H^{\dagger i} H^{\dagger k} B_L^{\lambda\rho} C_{L\mu\nu\lambda\rho} W_L^{I\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_7}^{i_4} \left(\tau^{I_3} \right)_{i_6}^{i_5} \quad (4.557)$$

$$\mathcal{O}_{C_L W_L^2 H^2 H^\dagger}^{(1,2)} \left| \tau_k^{Ii} \tau_l^{Jj} H_i H_j H^{\dagger k} H^{\dagger l} C_{L\mu\nu\lambda\rho} W_L^{I\lambda\rho} W_L^{J\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\tau^{I_2} \right)_{i_6}^{i_4} \left(\tau^{I_3} \right)_{i_7}^{i_5} \quad (4.558)$$

$$\mathcal{O}_{C_L G_L^2 H^2 H^\dagger} \left| H_i H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \delta^{A_2 A_3} \quad (4.559)$$

Class $C_L^2 \psi^2 \phi^3$: 3 types

$$\mathcal{O}_{C_L^2 \bar{e}_R l H H^\dagger} \left| \left(\bar{e}_{Rp} l_{Li} \right) H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \quad (4.560)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R q H H^\dagger} \left| \left(\bar{d}_{Rp}^a q_{Lrai} \right) H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \delta_{a_3}^{a_4} \quad (4.561)$$

$$\mathcal{O}_{C_L^2 q \bar{u}_R H^2 H^\dagger} \left| \left(\bar{u}_{Rr}^a q_{Lpai} \right) \epsilon^{ij} H_j H_k H^{\dagger k} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{i_7}^{i_6} \delta_{a_4}^{a_3} \epsilon^{i_3 i_5} \quad (4.562)$$

Class $C_L^3 \phi^4$: 1 types

$$\mathcal{O}_{C_L^3 H^2 H^\dagger} \left| H_i H_j H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{i_6}^{i_4} \delta_{i_7}^{i_5} \quad (4.563)$$

Class $C_L^2 \bar{\psi}^2 \phi^3$: 3 types

$$\mathcal{O}_{C_L^2 \bar{q}_R H H^\dagger} \left| \left(\bar{q}_p^{al} u_{Rra} \right) \epsilon_{jl} H_i H^{\dagger i} H^{\dagger j} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_6, f_7} [67] \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{a_6}^{a_7} \epsilon_{i_6 i_4} \quad (4.564)$$

$$\mathcal{O}_{C_L^2 e_R \bar{l} H^2 H^\dagger} \left| \left(\bar{l}_r^j e_{Rp} \right) H_i H_j H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_6, f_7} [67] \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_7}^{i_4} \quad (4.565)$$

$$\mathcal{O}_{C_L^2 d_R \bar{q} H^2 H^\dagger} \left| \left(\bar{q}_r^{aj} d_{Rpa} \right) H_i H_j H^{\dagger i} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \mathcal{C}_{f_6, f_7} [67] \langle 12 \rangle^4 \delta_{i_5}^{i_3} \delta_{i_7}^{i_4} \delta_{a_7}^{a_6} \quad (4.566)$$

Class $C_L^2 \phi^6$: 1 types

$$\mathcal{O}_{C_L^2 H^3 H^\dagger} \left| H_i H_j H_k H^{\dagger i} H^{\dagger j} H^{\dagger k} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \right| \langle 12 \rangle^4 \delta_{i_6}^{i_3} \delta_{i_7}^{i_4} \delta_{i_8}^{i_5} \quad (4.567)$$

5 GRLEFT operator/amplitude bases up to dim-10

5.1 Field content

The field content of the GRLEFT are listed in table 2. Similar as these in the GRSMEFT, the operators are constructed in two-component Weyl spinor notation and then converted to four-component Dirac spinor notation using the following relations:

$$\nu_L = \begin{pmatrix} \nu \\ 0 \end{pmatrix}, \quad e_L = \begin{pmatrix} e \\ 0 \end{pmatrix}, \quad e_R = \begin{pmatrix} 0 \\ e_c^\dagger \end{pmatrix}, \quad u_L = \begin{pmatrix} u \\ 0 \end{pmatrix}, \quad u_R = \begin{pmatrix} 0 \\ u_c^\dagger \end{pmatrix}, \quad d_L = \begin{pmatrix} d \\ 0 \end{pmatrix}, \quad d_R = \begin{pmatrix} 0 \\ d_c^\dagger \end{pmatrix}. \quad (5.1)$$

$$\bar{\nu}_L = (0, \nu^\dagger), \quad \bar{e}_L = (0, e^\dagger), \quad \bar{e}_R = (e_c, 0), \quad \bar{u}_L = (0, u^\dagger), \quad \bar{u}_R = (u_c, 0), \quad \bar{d}_L = (0, d^\dagger), \quad \bar{d}_R = (d_c, 0). \quad (5.2)$$

Fields	$SU(2)_l \times SU(2)_r$	h	$SU(3)_C$	$U(1)_{EM}$	Flavor	B	L
$C_{L\alpha\beta\gamma\delta}$	$(2, 0)$	-2	1	0	1	0	0
$G_{L\alpha\beta}^A$	$(1, 0)$	-1	8	0	1	0	0
$F_{L\alpha\beta}$	$(1, 0)$	-1	1	0	1	0	0
ν_α	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	1	0	n_e	0	1
e_α	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	1	-1	n_e	0	1
$e_{\mathbb{C}\alpha}$	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	1	1	n_e	0	-1
$u_{\alpha a}$	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	3	$\frac{2}{3}$	n_u	$\frac{1}{3}$	0
$u_{\mathbb{C}\alpha}^a$	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	$\bar{\mathbf{3}}$	$-\frac{2}{3}$	n_u	$-\frac{1}{3}$	0
$d_{\alpha a}$	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	3	$-\frac{1}{3}$	n_d	$\frac{1}{3}$	0
$d_{\mathbb{C}\alpha}^a$	$\left(\frac{1}{2}, 0\right)$	$-\frac{1}{2}$	$\bar{\mathbf{3}}$	$\frac{1}{3}$	n_d	$-\frac{1}{3}$	0

Table 2. The field content of the GRLEFT, along with their representations under the Lorentz and gauge groups. The representation under Lorentz group is denoted by (j_l, j_r) , while the helicity of the field is given by $h = j_r - j_l$. The numbers of lepton flavors, u-type quark flavors and d-type quark flavors are denoted as n_e , n_u and n_d respectively with $n_e = 3$, $n_u = 2$ and $n_d = 3$ in the GRLEFT. All of the fields are accompanied with their Hermitian conjugates that are omitted, $(C_{L\alpha\beta\gamma\delta})^\dagger = C_{R\dot{\alpha}\dot{\beta}\dot{\gamma}\dot{\delta}}$ for gravitons, $(F_{L\alpha\beta})^\dagger = F_{R\dot{\alpha}\dot{\beta}}$ for gauge bosons and $(\psi_\alpha)^\dagger = (\psi^\dagger)_{\dot{\alpha}}$ for fermions, which are under the conjugate representations of all the groups.

5.2 Dim-6 operator and amplitude bases

Class $C_L F_L^2$: 2 types

$$\mathcal{O}_{C_L F_L^2} \left| C_L^{\lambda\rho\mu\nu} F_{L\lambda\rho} F_{L\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (5.3)$$

$$\mathcal{O}_{C_L G_L^2} \left| C_L^{\lambda\rho\mu\nu} G_{L\lambda\rho}^A G_{L\mu\nu}^A \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \quad (5.4)$$

Class C_L^3 : 1 types

$$\mathcal{O}_{C_L^3} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (5.5)$$

5.3 Dim-7 operator and amplitude bases

Class $C_L F_L \psi^2$: 6 types

$$\mathcal{O}_{C_L F_L \nu^2} \left| \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} (\nu_{Lp} C \sigma^{\mu\nu} \nu_{Lr}) \right| \mathcal{C}_{f_3 f_4}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \quad (5.6)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} (\bar{e}_{Rp} \sigma^{\mu\nu} e_{Lr}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \quad (5.7)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} d_{Lra}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \quad (5.8)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R u_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} (\bar{u}_{Rp}^a \sigma^{\mu\nu} u_{Lra}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \quad (5.9)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_L} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} d_{Lrb}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \quad (5.10)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_L} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} (\bar{u}_{Rp}^a \sigma^{\mu\nu} u_{Lrb}) \right| \mathcal{C}_{f_3, f_4} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \quad (5.11)$$

Class $C_L^2\psi^2$: 4 types

$$\mathcal{O}_{C_L^2\nu^2} \left| \mathcal{Y} [\overline{p}] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \nu_{Lp} C_{\nu Lr} \left| \mathcal{C}_{f_3f_4}^{[2]} \langle 12 \rangle^4 \langle 34 \rangle \right| \right| \quad (5.12)$$

$$\mathcal{O}_{C_L^2\bar{e}_R e_L} \left| (\bar{e}_{Rp} e_{Lr}) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} \langle 12 \rangle^4 \langle 34 \rangle \right| \right| \quad (5.13)$$

$$\mathcal{O}_{C_L^2\bar{d}_R d_L} \left| \left(\bar{d}_{Rp}^a d_{Lra} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a3}^{a4} \right| \right| \quad (5.14)$$

$$\mathcal{O}_{C_L^2\bar{u}_R u_L} \left| \left(\bar{u}_{Rp}^a u_{Lra} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a3}^{a4} \right| \right| \quad (5.15)$$

Class $C_L^2\bar{\psi}^2$: 4 types

$$\mathcal{O}_{C_L^2\bar{\nu}^2} \left| \mathcal{Y} [\overline{p}] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \bar{\nu}_{Lp} C_{\bar{\nu} Lr} \left| \mathcal{C}_{f_3f_4}^{[2]} [34] \langle 12 \rangle^4 \right| \right| \quad (5.16)$$

$$\mathcal{O}_{C_L^2\bar{e}_R \bar{e}_L} \left| (\bar{e}_{Lr} e_{Rp}) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^4 \right| \right| \quad (5.17)$$

$$\mathcal{O}_{C_L^2\bar{d}_R \bar{d}_L} \left| \left(\bar{d}_{Lr}^a d_{Rpa} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^4 \delta_{a4}^{a3} \right| \right| \quad (5.18)$$

$$\mathcal{O}_{C_L^2\bar{u}_R \bar{u}_L} \left| \left(\bar{u}_{Lr}^a u_{Rpa} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^4 \delta_{a4}^{a3} \right| \right| \quad (5.19)$$

5.4 Dim-8 operator and amplitude bases

Class $C_L F_L^3$: 1 types

$$\mathcal{O}_{C_L F_L G_L^2} \left| C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} G_L^{A\mu\nu} F_{L\eta}{}^\rho \left| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{A_3 A_4} \right| \right| \quad (5.20)$$

Class $C_L^2 F_L^2$: 2 types

$$\mathcal{O}_{C_L^2 F_L^2}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_{L\eta\xi} F_L^{\eta\xi}}{C_{L\mu\nu\lambda\rho} F_L^{\eta\xi} F_L^{\mu\nu} C_{L\eta\xi}{}^{\lambda\rho}} \left| \langle 12 \rangle^4 \langle 34 \rangle^2 \right| \right| \quad (5.21)$$

$$\mathcal{O}_{C_L^2 G_L^2}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\mu\nu}}{C_{L\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\mu\nu} C_{L\eta\xi}{}^{\lambda\rho}} \left| \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{A_3 A_4} \right| \right| \quad (5.22)$$

Class C_L^4 : 1 types

$$\mathcal{O}_{C_L^4} \left| C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\eta\xi\tau\nu} C_L^{\mu\nu\lambda\rho} \left| \langle 12 \rangle^4 \langle 34 \rangle^4 \right| \right| \quad (5.23)$$

Class $C_L F_L \psi \bar{\psi} D$: 11 types

$$\mathcal{O}_{C_L F_L \nu \bar{\nu} D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{\nu}_{Lr} \gamma^\rho \nu_{Lp} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \right| \right| \quad (5.24)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{e}_{Rp} \gamma^\rho e_{Rr} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \right| \right| \quad (5.25)$$

$$\mathcal{O}_{C_L F_L e_L \bar{e}_L D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{e}_{Lr} \gamma^\rho e_{Lp} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \right| \right| \quad (5.26)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rra} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a3}^{a4} \right| \right| \quad (5.27)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{d}_{Lr}^a \gamma^\rho d_{Lpa} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a4}^{a3} \right| \right| \quad (5.28)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R u_R D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rra} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a3}^{a4} \right| \right| \quad (5.29)$$

$$\mathcal{O}_{C_L F_L u_L \bar{u}_L D} \left| C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_L^{\nu\lambda} \right) \left(\bar{u}_{Lr}^a \gamma^\rho u_{Lpa} \right) \left| \mathcal{C}_{f_3f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a4}^{a3} \right| \right| \quad (5.30)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_R D} \left| \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{d}_{Rp}{}^a \gamma^\rho d_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (5.31)$$

$$\mathcal{O}_{C_L G_L d_L \bar{d}_L D} \left| \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{d}_{Lr}{}^b \gamma^\rho d_{Lpa} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_4}^{a_3} \quad (5.32)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_R D} \left| \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{u}_{Rp}{}^a \gamma^\rho u_{Rrb} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_3}^{a_4} \quad (5.33)$$

$$\mathcal{O}_{C_L G_L u_L \bar{u}_L D} \left| \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu \left(D_\mu G_L^{A\nu\lambda} \right) \left(\bar{u}_{Lr}{}^b \gamma^\rho u_{Lpa} \right) \right| \mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_2} \right)_{a_4}^{a_3} \quad (5.34)$$

Class $C_R^2 F_L^2$: 2 types

$$\mathcal{O}_{C_R^2 F_L^2} \left| C_{R\lambda\rho\eta\xi} C_R^{\lambda\rho\eta\xi} F_{L\mu\nu} F_L^{\mu\nu} \right| [34]^4 \langle 12 \rangle^2 \quad (5.35)$$

$$\mathcal{O}_{C_R^2 G_L^2} \left| C_{R\lambda\rho\eta\xi} C_R^{\lambda\rho\eta\xi} G_{L\mu\nu}^A G_L^{A\mu\nu} \right| [34]^4 \langle 12 \rangle^2 \delta^{A_1 A_2} \quad (5.36)$$

Class $C_L^2 C_R^2$: 1 types

$$\mathcal{O}_{C_L^2 C_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} C_{R\eta\xi\tau\nu} C_R^{\eta\xi\tau\nu} \right| [34]^4 \langle 12 \rangle^4 \quad (5.37)$$

Class $C_L \psi^4$: 17 types

$$\mathcal{O}_{C_L \bar{e}_R e_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} e_{Lr} \right) \left(\nu_{Ls} C \sigma^{\mu\nu} \nu_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \quad (5.38)$$

$$\mathcal{O}_{C_L \bar{e}_R^2 e_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p & s \\ r & t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} \left(e_{Ls} C \sigma^{\mu\nu} e_{Lt} \right) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \right| \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2], [2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \quad (5.39)$$

$$\mathcal{O}_{C_L \bar{d}_R^3 e_L} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r & s \\ t \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rs}^c \sigma^{\mu\nu} e_{Lt} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) \right| \mathcal{C}_{f_2 f_3 f_4, f_5}^{[3]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon_{a_2 a_3 a_4} \quad (5.40)$$

$$\mathcal{O}_{C_L \bar{d}_R^2 \nu \bar{u}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rs}^c \sigma^{\mu\nu} \nu_{Lt} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon_{a_2 a_3 a_4} \quad (5.41)$$

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R \bar{u}_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ r \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \left(\bar{u}_{Rs}^b \sigma^{\mu\nu} C \bar{u}_{Rt}^c \right) \right| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon_{a_2 a_4 a_5} \quad (5.42)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} d_{Lra} \right) \left(\nu_{Ls} C \sigma^{\mu\nu} \nu_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_3} \quad (5.43)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L \bar{e}_R e_L} \left| C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} d_{Lra} \right) \left(\bar{e}_{Rs} \sigma^{\mu\nu} e_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_3} \quad (5.44)$$

$$\mathcal{O}_{C_L d_L \bar{e}_R \nu \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rr} \sigma^{\lambda\rho} d_{Lpa} \right) \left(\bar{u}_{Rs}^a \sigma^{\mu\nu} \nu_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_4}^{a_2} \quad (5.45)$$

$$\mathcal{O}_{C_L \bar{d}_R e_L \nu u_L} \left| C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} e_{Lr} \right) \left(u_{Lsa} C \sigma^{\mu\nu} \nu_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \quad (5.46)$$

$$\mathcal{O}_{C_L \nu^2 \bar{u}_R u_L} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \sigma^{\lambda\rho} u_{Lra} \right) \left(\nu_{Ls} C \sigma^{\mu\nu} \nu_{Lt} \right) \right| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_3} \quad (5.47)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L \bar{u}_R u_L} \left| C_{L\mu\nu\lambda\rho} \left(\bar{e}_{Rp} \sigma^{\lambda\rho} e_{Lr} \right) \left(\bar{u}_{Rs}^a \sigma^{\mu\nu} u_{Lta} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_4}^{a_5} \quad (5.48)$$

$$\mathcal{O}_{C_L \bar{d}_R^2 d_L^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r, & s & t \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} \left(d_{Lsa} C \sigma^{\mu\nu} d_{Ltb} \right) \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} C \bar{d}_{Rr}^b \right) \right| \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2], [2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \delta_{a_3}^{a_5} \quad (5.49)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} d_{Lra} \right) \left(\bar{u}_{Rs}^c \sigma^{\mu\nu} u_{Ltc} \right) \\ C_{L\mu\nu\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\lambda\rho} d_{Lrb} \right) \left(\bar{u}_{Rs}^b \sigma^{\mu\nu} u_{Lta} \right) \end{array} \right| \mathcal{C}_{f_2, f_3, f_4, f_5} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_3} \delta_{a_4}^{a_5} \quad (5.50)$$

$$\mathcal{O}_{C_L \bar{u}_R^3 u_L^2}^{(1,2)} \left| \frac{\mathcal{Y}[\overline{[p][r]}, \overline{[s][t]}] C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \sigma^{\lambda\rho} C \bar{u}_{Rr}^b \right) (u_{Lsa} C \sigma^{\mu\nu} u_{Ltb})}{\mathcal{Y}[\overline{[p]}, \overline{[s]}] C_{L\mu\nu\lambda\rho} \left(\bar{u}_{Rp}^a \sigma^{\lambda\rho} C \bar{u}_{Rr}^b \right) (u_{Lsa} C \sigma^{\mu\nu} u_{Ltb})} \left| \frac{\mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \delta_{a_3}^{a_5}}{\mathcal{C}_{f_2 f_3, f_4 f_5}^{[1],[1],[1],[1]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \delta_{a_2}^{a_4} \delta_{a_3}^{a_5}} \right| \quad (5.51)$$

$$\mathcal{O}_{C_L d_L^3 \bar{e}_R} \left| \mathcal{Y}[\overline{[p][r][s]}] \epsilon^{abc} C_{L\mu\nu\lambda\rho} (\bar{e}_{Rt} \sigma^{\mu\nu} d_{Lsc}) (d_{Lpa} C \sigma^{\lambda\rho} d_{Lrb}) \left| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[3]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{a_2 a_3 a_4} \right| \right| \quad (5.52)$$

$$\mathcal{O}_{C_L d_L^2 \nu u_L} \left| \mathcal{Y}[\overline{[p][r]}] \epsilon^{abc} C_{L\mu\nu\lambda\rho} (d_{Lpa} C \sigma^{\lambda\rho} d_{Lrb}) (u_{Lsc} C \sigma^{\mu\nu} \nu_{Lt}) \left| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{a_2 a_3 a_4} \right| \right| \quad (5.53)$$

$$\mathcal{O}_{C_L d_L e_L u_L^2} \left| \mathcal{Y}[\overline{[s][t]}] \epsilon^{abc} C_{L\mu\nu\lambda\rho} (d_{Lpa} C \sigma^{\lambda\rho} e_{Lr}) (u_{Lsb} C \sigma^{\mu\nu} u_{Ltc}) \left| \mathcal{C}_{f_2, f_3, f_4 f_5}^{[2]} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \epsilon^{a_2 a_4 a_5} \right| \right| \quad (5.54)$$

5.5 Dim-9 operator and amplitude bases

Class $C_L F_L \psi^2 D^2$: 6 types

$$\mathcal{O}_{C_L F_L \nu^2 D^2}^{(1,2)} \left| \frac{\mathcal{Y}[\overline{[p][r]}] F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \nu_{Lp}) C \sigma^{\nu\lambda} \nu_{Lr} \right)}{\mathcal{Y}[\overline{[p]}] C_{L\lambda\rho}{}^{\nu\mu} (D_\mu F_L^{\lambda\rho}) \left((D_\nu \nu_{Lp}) C \nu_{Lr} \right)} \left| \frac{\mathcal{C}_{f_3 f_4}^{[2]} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle}{\mathcal{C}_{f_3 f_4}^{[1],[1]} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle} \right| \right| \quad (5.55)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_L D^2}^{(1,2)} \left| \frac{C_{L\lambda\rho}{}^{\nu\mu} (D_\mu F_L^{\lambda\rho}) \left((D_\nu \bar{e}_{Rp}) e_{Lr} \right)}{F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{e}_{Rp}) \sigma^{\nu\lambda} e_{Lr} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle} \right| \right| \quad (5.56)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_L D^2}^{(1,2)} \left| \frac{C_{L\lambda\rho}{}^{\nu\mu} (D_\mu F_L^{\lambda\rho}) \left((D_\nu \bar{d}_{Rp}^a) d_{Lra} \right)}{F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{d}_{Rp}^a) \sigma^{\nu\lambda} d_{Lra} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{a_3}^{a_4}} \right| \right| \quad (5.57)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R u_L D^2}^{(1,2)} \left| \frac{C_{L\lambda\rho}{}^{\nu\mu} (D_\mu F_L^{\lambda\rho}) \left((D_\nu \bar{u}_{Rp}^a) u_{Lra} \right)}{F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{u}_{Rp}^a) \sigma^{\nu\lambda} u_{Lra} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta_{a_3}^{a_4}} \right| \right| \quad (5.58)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_L D^2}^{(1,2)} \left| \frac{\lambda_a^{Ab} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu G_L^{A\lambda\rho}) \left((D_\nu \bar{d}_{Rp}^a) d_{Lrb} \right)}{\lambda_a^{Ab} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{d}_{Rp}^a) \sigma^{\nu\lambda} d_{Lrb} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4}} \right| \right| \quad (5.59)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_L D^2}^{(1,2)} \left| \frac{\lambda_a^{Ab} C_{L\lambda\rho}{}^{\nu\mu} (D_\mu G_L^{A\lambda\rho}) \left((D_\nu \bar{u}_{Rp}^a) u_{Lrb} \right)}{\lambda_a^{Ab} G_L^{A\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{u}_{Rp}^a) \sigma^{\nu\lambda} u_{Lrb} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4}} \right| \right| \quad (5.60)$$

Class $C_L^2 \psi^2 D^2$: 4 types

$$\mathcal{O}_{C_L^2 \nu^2 D^2}^{(1,2)} \left| \frac{\mathcal{Y}[\overline{[p][r]}] \nu_{Lp} C \nu_{Lr} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta})}{\mathcal{Y}[\overline{[p][r]}] C_{L\xi}{}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \nu_{Lp}) C \sigma^{\xi\nu} \nu_{Lr} \right)} \left| \frac{\mathcal{C}_{f_3 f_4}^{[2]} s_{34} \langle 12 \rangle^4 \langle 34 \rangle}{\mathcal{C}_{f_3 f_4}^{[2]} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2} \right| \right| \quad (5.61)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_L D^2}^{(1,2)} \left| \frac{(\bar{e}_{Rp} e_{Lr}) (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta})}{C_{L\xi}{}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{e}_{Rp}) \sigma^{\xi\nu} e_{Lr} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2} \right| \right| \quad (5.62)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_L D^2}^{(1,2)} \left| \frac{(\bar{d}_{Rp}^a d_{Lra}) (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta})}{C_{L\xi}{}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{d}_{Rp}^a) \sigma^{\xi\nu} d_{Lra} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_3}^{a_4}} \right| \right| \quad (5.63)$$

$$\mathcal{O}_{C_L^2 \bar{u}_R u_L D^2}^{(1,2)} \left| \frac{(\bar{u}_{Rp}^a u_{Lra}) (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta})}{C_{L\xi}{}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left((D^\mu \bar{u}_{Rp}^a) \sigma^{\xi\nu} u_{Lra} \right)} \left| \frac{\mathcal{C}_{f_3, f_4} s_{34} \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4}}{\mathcal{C}_{f_3, f_4} [34] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_3}^{a_4}} \right| \right| \quad (5.64)$$

Class $C_L F_R \psi^2 D^2$: 6 types

$$\mathcal{O}_{C_L F_R \nu^2 D^2} \left| \mathcal{Y} \left[\frac{p}{r} \right] F_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \nu_{Lp}) C \sigma^{\eta\lambda} \nu_{Lr} \right) \right| \mathcal{C}_{f_2 f_3}^{[2]} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \left| \quad (5.65)$$

$$\mathcal{O}_{C_L F_R \bar{e}_R e_L D^2} \left| F_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{e}_{Rp}) \sigma^{\eta\lambda} e_{Lr} \right) \right| \mathcal{C}_{f_2, f_3} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \left| \quad (5.66)$$

$$\mathcal{O}_{C_L F_R \bar{d}_R d_L D^2} \left| F_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} d_{Lra} \right) \right| \mathcal{C}_{f_2, f_3} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \left| \quad (5.67)$$

$$\mathcal{O}_{C_L F_R \bar{u}_R u_L D^2} \left| F_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{u}_{Rp}^a) \sigma^{\eta\lambda} u_{Lra} \right) \right| \mathcal{C}_{f_2, f_3} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \left| \quad (5.68)$$

$$\mathcal{O}_{C_L G_R \bar{d}_R d_L D^2} \left| \lambda_a^{Ab} G_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{d}_{Rp}^a) \sigma^{\eta\lambda} d_{Lrb} \right) \right| \mathcal{C}_{f_2, f_3} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \left(\lambda^{A_4} \right)_{a_2}^{a_3} \left| \quad (5.69)$$

$$\mathcal{O}_{C_L G_R \bar{u}_R u_L D^2} \left| \lambda_a^{Ab} G_{R\eta}{}^\rho C_{L\lambda}{}^\nu{}_\rho{}^\mu \left((D_\mu D_\nu \bar{u}_{Rp}^a) \sigma^{\eta\lambda} u_{Lrb} \right) \right| \mathcal{C}_{f_2, f_3} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \left(\lambda^{A_4} \right)_{a_2}^{a_3} \left| \quad (5.70)$$

Class $C_L F_L \bar{\psi}^2 D^2$: 6 types

$$\mathcal{O}_{C_L F_L \bar{\nu}^2 D^2} \left| \mathcal{Y} \left[\frac{p}{r} \right] C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu F_L^{\lambda\rho} \right) \left((D_\nu \bar{\nu}_{Lp}) C \bar{\nu}_{Lr} \right) \right| \mathcal{C}_{f_3 f_4}^{[2]} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left| \quad (5.71)$$

$$\mathcal{O}_{C_L F_L e_R \bar{e}_L D^2} \left| C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu F_L^{\lambda\rho} \right) \left(\bar{e}_{Lr} (D_\nu e_{Rp}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left| \quad (5.72)$$

$$\mathcal{O}_{C_L F_L d_R \bar{d}_L D^2} \left| C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu F_L^{\lambda\rho} \right) \left(\bar{d}_{Lr}^a (D_\nu d_{Rpa}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \left| \quad (5.73)$$

$$\mathcal{O}_{C_L F_L u_R \bar{u}_L D^2} \left| C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu F_L^{\lambda\rho} \right) \left(\bar{u}_{Lr}^a (D_\nu u_{Rpa}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \left| \quad (5.74)$$

$$\mathcal{O}_{C_L G_L d_R \bar{d}_L D^2} \left| \lambda_a^{Aa} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\bar{d}_{Lr}^b (D_\nu d_{Rpa}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_3} \left| \quad (5.75)$$

$$\mathcal{O}_{C_L G_L u_R \bar{u}_L D^2} \left| \lambda_a^{Aa} C_{L\lambda\rho}{}^{\nu\mu} \left(D_\mu G_L^{A\lambda\rho} \right) \left(\bar{u}_{Lr}^b (D_\nu u_{Rpa}) \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_3} \left| \quad (5.76)$$

Class $C_L^2 \bar{\psi}^2 D^2$: 4 types

$$\mathcal{O}_{C_L^2 \bar{\nu}^2 D^2} \left| \mathcal{Y} \left[\frac{p}{r} \right] \bar{\nu}_{Lp} C \bar{\nu}_{Lr} (D_\mu C_{L\nu\lambda\rho\eta}) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \right| \mathcal{C}_{f_3 f_4}^{[2]} [34] s_{34} \langle 12 \rangle^4 \left| \quad (5.77)$$

$$\mathcal{O}_{C_L^2 e_R \bar{e}_L D^2} \left| (\bar{e}_{Lr} e_{Rp}) (D_\mu C_{L\nu\lambda\rho\eta}) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^4 \left| \quad (5.78)$$

$$\mathcal{O}_{C_L^2 d_R \bar{d}_L D^2} \left| (\bar{d}_{Lr}^a d_{Rpa}) (D_\mu C_{L\nu\lambda\rho\eta}) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^4 \delta_{a_4}^{a_3} \left| \quad (5.79)$$

$$\mathcal{O}_{C_L^2 u_R \bar{u}_L D^2} \left| (\bar{u}_{Lr}^a u_{Rpa}) (D_\mu C_{L\nu\lambda\rho\eta}) \left(D^\mu C_L^{\nu\lambda\rho\eta} \right) \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^4 \delta_{a_4}^{a_3} \left| \quad (5.80)$$

Class $C_L F_L^2 \psi^2$: 10 types

$$\mathcal{O}_{C_L F_L^2 \nu^2}^{(1,2)} \left| \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \nu_{Lp} C \nu_{Lr} \right| \mathcal{C}_{f_4 f_5}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \left| \quad (5.81)$$

$$\mathcal{O}_{C_L F_L^2 \bar{e}_R e_L}^{(1,2)} \left| (\bar{e}_{Rp} e_{Lr}) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \left| \quad (5.82)$$

$$\mathcal{O}_{C_L F_L^2 \bar{d}_R d_L}^{(1,2)} \left| (\bar{d}_{Rp}^a d_{Lra}) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \left| \quad (5.83)$$

$$\mathcal{O}_{C_L F_L^2 \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} (\bar{u}_{Rp}^a u L_{ra}) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \\ C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} (\bar{u}_{Rp}^a \sigma^{\eta\mu} u L_{ra}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \right| \quad (5.84)$$

$$\mathcal{O}_{C_L F_L G_L \bar{d}_R d_L}^{(1\sim 3)} \left| \begin{array}{l} (\bar{d}_{Rp}^a d L_{rb}) \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} \\ \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} (\bar{d}_{Rp}^a \sigma^{\eta\mu} d L_{rb}) \\ \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} F_L^{\eta\rho} (\bar{d}_{Rp}^a \sigma^{\mu\nu} d L_{rb}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle (\lambda^{A_3})_{a_4}^{a_5} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle (\lambda^{A_3})_{a_4}^{a_5} \right| \quad (5.85)$$

$$\mathcal{O}_{C_L F_L G_L \bar{u}_R u_L}^{(1\sim 3)} \left| \begin{array}{l} (\bar{u}_{Rp}^a u L_{rb}) \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} \\ \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} (\bar{u}_{Rp}^a \sigma^{\eta\mu} u L_{rb}) \\ \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\eta} F_L^{\eta\rho} (\bar{u}_{Rp}^a \sigma^{\mu\nu} u L_{rb}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle (\lambda^{A_3})_{a_4}^{a_5} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle (\lambda^{A_3})_{a_4}^{a_5} \right| \quad (5.86)$$

$$\mathcal{O}_{C_L G_L^2 \nu^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \nu_{Lp} C \nu_{Lr} \\ \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} (\nu_{Lp} C \sigma^{\eta\mu} \nu_{Lr}) \end{array} \right| \mathcal{C}_{f_4 f_5}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta^{A_2 A_3} \left| \mathcal{C}_{f_4 f_5}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta^{A_2 A_3} \right| \quad (5.87)$$

$$\mathcal{O}_{C_L G_L^2 \bar{e}_R e_L}^{(1,2)} \left| \begin{array}{l} (\bar{e}_{Rp} e L_r) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} (\bar{e}_{Rp} \sigma^{\eta\mu} e L_r) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta^{A_2 A_3} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta^{A_2 A_3} \right| \quad (5.88)$$

$$\mathcal{O}_{C_L G_L^2 \bar{d}_R d_L}^{(1\sim 5)} \left| \begin{array}{l} (\bar{d}_{Rp}^a d L_{ra}) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} (\bar{d}_{Rp}^a \sigma^{\eta\mu} d L_{ra}) \\ (\bar{d}_{Rp}^a d L_{rb}) d^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \\ d^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} (\bar{d}_{Rp}^a \sigma^{\eta\mu} d L_{rb}) \\ f^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} (\bar{d}_{Rp}^a \sigma^{\eta\mu} d L_{rb}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \right| \quad (5.89)$$

$$\mathcal{O}_{C_L G_L^2 \bar{u}_R u_L}^{(1\sim 5)} \left| \begin{array}{l} (\bar{u}_{Rp}^a u L_{ra}) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} (\bar{u}_{Rp}^a \sigma^{\eta\mu} u L_{ra}) \\ (\bar{u}_{Rp}^a u L_{rb}) d^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \\ d^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} (\bar{u}_{Rp}^a \sigma^{\eta\mu} u L_{rb}) \\ f^{ABC} \lambda_a^{Cb} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} (\bar{u}_{Rp}^a \sigma^{\eta\mu} u L_{rb}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \delta^{A_2 A_3} \right| \quad (5.90)$$

Class $C_L^2 F_L \psi^2$: 6 types

$$\mathcal{O}_{C_L^2 F_L \nu^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_{L\eta\xi} (\nu_{Lp} C \sigma^{\eta\xi} \nu_{Lr}) \\ \mathcal{Y} \left[\frac{p}{r} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\nu_{Lp} C \sigma^{\eta\xi} \nu_{Lr}) \end{array} \right| \mathcal{C}_{f_4 f_5}^{[1,1]} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \left| \mathcal{C}_{f_4 f_5}^{[1,1]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \right| \quad (5.91)$$

$$\mathcal{O}_{C_L^2 F_L \bar{e}_R e_L}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{e}_{Rp} \sigma^{\eta\xi} e_{Lr}) \\ C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\bar{e}_{Rp} \sigma^{\eta\xi} e_{Lr}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \right| \quad (5.92)$$

$$\mathcal{O}_{C_L^2 F_L \bar{d}_R d_L}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{d}_{Rp}^a \sigma^{\eta\xi} d L_{ra}) \\ C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\bar{d}_{Rp}^a \sigma^{\eta\xi} d L_{ra}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_4}^{a_5} \right| \quad (5.93)$$

$$\mathcal{O}_{C_L^2 F_L \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{u}_{Rp}^a \sigma^{\eta\xi} u L_{ra}) \\ C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} C_{L\eta\xi}^{\lambda\rho} (\bar{u}_{Rp}^a \sigma^{\eta\xi} u L_{ra}) \end{array} \right| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \delta_{a_4}^{a_5} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \delta_{a_4}^{a_5} \right| \quad (5.94)$$

$$\mathcal{O}_{C_L^2 G_L \bar{d}_R d_L}^{(1,2)} \left| \begin{array}{l} \lambda_{ab}^{Ab} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A \eta_\xi \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} d_{Lrb} \right) \\ \lambda_{ab}^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} C_{L\eta\xi}^{\lambda\rho} \left(\bar{d}_{Rp}^a \sigma^{\eta\xi} d_{Lrb} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \left(\lambda^{A_3} \right)^{a_5} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \left(\lambda^{A_3} \right)^{a_4} \end{array} \quad (5.95)$$

$$\mathcal{O}_{C_L^2 G_L \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} \lambda_{ab}^{Ab} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A \eta_\xi \left(\bar{u}_{Rp}^a \sigma^{\eta\xi} u_{Lrb} \right) \\ \lambda_{ab}^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} C_{L\eta\xi}^{\lambda\rho} \left(\bar{u}_{Rp}^a \sigma^{\eta\xi} u_{Lrb} \right) \end{array} \right| \begin{array}{l} C_{f_4, f_5} \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \left(\lambda^{A_3} \right)^{a_5} \\ C_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle \langle 25 \rangle \left(\lambda^{A_3} \right)^{a_4} \end{array} \quad (5.96)$$

Class $C_L^3 \psi^2$: 4 types

$$\mathcal{O}_{C_L^3 \nu^2} \left| \mathcal{Y} \left[\overline{[p r]} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \nu_{Lp} C \nu_{Lr} \left| \mathcal{C}_{f_4, f_5}^{[2]} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \right| \right. \quad (5.97)$$

$$\mathcal{O}_{C_L^3 \bar{e}_R e_L} \left| \left(\bar{e}_{Rp} e_{Lr} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \right| \right. \quad (5.98)$$

$$\mathcal{O}_{C_L^3 \bar{d}_R d_L} \left| \left(\bar{d}_{Rp}^a d_{Lra} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \right| \right. \quad (5.99)$$

$$\mathcal{O}_{C_L^3 \bar{u}_R u_L} \left| \left(\bar{u}_{Rp}^a u_{Lra} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle \delta_{a_4}^{a_5} \right| \right. \quad (5.100)$$

Class $C_L F_L^2 \bar{\psi}^2$: 10 types

$$\mathcal{O}_{C_L F_L^2 \bar{\nu}^2} \left| \mathcal{Y} \left[\overline{[p r]} \right] C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \bar{\nu}_{Lp} C \bar{\nu}_{Lr} \left| \mathcal{C}_{f_4, f_5}^{[2]} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \right| \right. \quad (5.101)$$

$$\mathcal{O}_{C_L F_L^2 e_R \bar{e}_L} \left| \left(\bar{e}_{Lr} e_{Rp} \right) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \right| \right. \quad (5.102)$$

$$\mathcal{O}_{C_L F_L^2 d_R \bar{d}_L} \left| \left(\bar{d}_{Lr}^a d_{Rpa} \right) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_4} \right| \right. \quad (5.103)$$

$$\mathcal{O}_{C_L F_L^2 u_R \bar{u}_L} \left| \left(\bar{u}_{Lr}^a u_{Rpa} \right) C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_4} \right| \right. \quad (5.104)$$

$$\mathcal{O}_{C_L F_L G_L d_R \bar{d}_L} \left| \left(\bar{d}_{Lr}^b d_{Rpa} \right) \lambda_{ab}^{Aa} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_3} \right)_{a_5}^{a_4} \right| \right. \quad (5.105)$$

$$\mathcal{O}_{C_L F_L G_L u_R \bar{u}_L} \left| \left(\bar{u}_{Lr}^b u_{Rpa} \right) \lambda_{ab}^{Aa} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \left(\lambda^{A_3} \right)_{a_5}^{a_4} \right| \right. \quad (5.106)$$

$$\mathcal{O}_{C_L G_L^2 \bar{\nu}^2} \left| \mathcal{Y} \left[\overline{[p r]} \right] C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \bar{\nu}_{Lp} C \bar{\nu}_{Lr} \left| \mathcal{C}_{f_4, f_5}^{[2]} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \right| \right. \quad (5.107)$$

$$\mathcal{O}_{C_L G_L^2 e_R \bar{e}_L} \left| \left(\bar{e}_{Lr} e_{Rp} \right) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \right| \right. \quad (5.108)$$

$$\mathcal{O}_{C_L G_L^2 d_R \bar{d}_L}^{(1,2)} \left| \begin{array}{l} \left(\bar{d}_{Lr}^a d_{Rpa} \right) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ \left(\bar{d}_{Lr}^b d_{Rpa} \right) d^{ABC} \lambda_{ab}^{Ca} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_4} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_4} \end{array} \quad (5.109)$$

$$\mathcal{O}_{C_L G_L^2 u_R \bar{u}_L}^{(1,2)} \left| \begin{array}{l} \left(\bar{u}_{Lr}^a u_{Rpa} \right) C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} \\ \left(\bar{u}_{Lr}^b u_{Rpa} \right) d^{ABC} \lambda_{ab}^{Ca} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_5}^{a_4} \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_3} \left(\lambda^C \right)_{a_5}^{a_4} \end{array} \quad (5.110)$$

Class $C_L^3 \bar{\psi}^2$: 4 types

$$\mathcal{O}_{C_L^3 \bar{\nu}^2} \left| \mathcal{Y} \left[\overline{[p r]} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \bar{\nu}_{Lp} C \bar{\nu}_{Lr} \left| \mathcal{C}_{f_4, f_5}^{[2]} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \right| \right. \quad (5.111)$$

$$\mathcal{O}_{C_L^3 e_R \bar{e}_L} \left| \left(\bar{e}_{Lr} e_{Rp} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \right| \right. \quad (5.112)$$

$$\mathcal{O}_{C_L^3 d_R \bar{d}_L} \left| \left(\bar{d}_{Lr}^a d_{Rpa} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{a_5}^{a_4} \right| \right. \quad (5.113)$$

$$\mathcal{O}_{C_L^3 u_R \bar{u}_L} \left| \left(\bar{u}_{Lr}^a u_{Rpa} \right) C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{L\eta\xi}^{\lambda\rho} \left| \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta_{a_5}^{a_4} \right| \right. \quad (5.114)$$

Class $C_L \psi^3 \bar{\psi} D$: 52 types

$$\mathcal{O}_{C_L \nu^3 \bar{\nu} D} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{\nu}_{Lt} \gamma^\rho (D_\mu \nu_{Lp})) (\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2 f_3 f_4, f_5}^{[2,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \quad (5.115)$$

$$\mathcal{O}_{C_L \bar{e}_R e_R \nu^2 D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ s & t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{e}_{Rp} \gamma^\rho e_{Rt}) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rt}) (\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \quad (5.116)$$

$$\mathcal{O}_{C_L e_L \bar{e}_L \nu^2 D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ s & t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{e}_{Lt} \gamma^\rho e_{Lp}) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{e}_{Lt} \gamma^\rho (D_\mu e_{Lp})) (\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \quad (5.117)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L \nu \bar{\nu} D}^{(1,2)} \left| C_{L\nu\lambda\rho}{}^\mu (\bar{\nu}_{Lt} \gamma^\rho C (D_\mu \bar{e}_{Rp})) (e_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \left| C_{L\nu\lambda\rho}{}^\mu (\bar{\nu}_{Lt} \gamma^\rho C \bar{e}_{Rp}) \left((D_\mu e_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \Big| \quad (5.118)$$

$$\mathcal{O}_{C_L \bar{e}_R^2 e_R e_L D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rt}) (\bar{e}_{Rr} \sigma^{\nu\lambda} e_{Ls}) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ p & r \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{e}_{Rp}) \gamma^\rho e_{Rt}) (\bar{e}_{Rr} \sigma^{\nu\lambda} e_{Ls}) \right| \mathcal{C}_{f_2 f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \quad (5.119)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L^2 \bar{e}_L D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} r & s \\ r & s \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{e}_{Lt} \gamma^\rho C \bar{e}_{Rp}) \left((D_\mu e_{Lr}) C \sigma^{\nu\lambda} e_{Ls} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{e}_{Lt} \gamma^\rho C (D_\mu \bar{e}_{Rp})) (e_{Lr} C \sigma^{\nu\lambda} e_{Ls}) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \Big| \quad (5.120)$$

$$\mathcal{O}_{C_L \bar{d}_R d_R \nu^2 D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ s & t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Rp}^a \gamma^\rho d_{Rta}) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu ((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rta}) (\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \Big| \quad (5.121)$$

$$\mathcal{O}_{C_L \bar{d}_R e_L \nu u_R D}^{(1,2)} \left| C_{L\nu\lambda\rho}{}^\mu \left((D_\mu \bar{d}_{Rp}^a) \gamma^\rho u_{Rta} \right) (e_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \Big| \left| C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Rp}^a \gamma^\rho u_{Rta}) \left((D_\mu e_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_5} \Big| \quad (5.122)$$

$$\mathcal{O}_{C_L \bar{d}_R d_R \bar{e}_R e_L D}^{(1,2)} \left| C_{L\nu\lambda\rho}{}^\mu \left((D_\mu \bar{d}_{Rp}^a) \gamma^\rho d_{Rta} \right) (\bar{e}_{Rr} \sigma^{\nu\lambda} e_{Ls}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5} \Big| \left| C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Rp}^a \gamma^\rho d_{Rta}) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} e_{Ls} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_5} \Big| \quad (5.123)$$

$$\mathcal{O}_{C_L d_L \bar{d}_L \nu^2 D}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ s & t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Lt}^a \gamma^\rho d_{Lpa}) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2} \Big| \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ t \end{smallmatrix} \right] C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Lt}^a \gamma^\rho (D_\mu d_{Lpa})) (\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3 f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2} \Big| \quad (5.124)$$

$$\mathcal{O}_{C_L d_L \bar{e}_R \nu \bar{u}_L D}^{(1,2)} \left| C_{L\nu\lambda\rho}{}^\mu (\bar{u}_{Lt}^a \gamma^\rho (D_\mu d_{Lpa})) (\bar{e}_{Rr} \sigma^{\nu\lambda} \nu_{Ls}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2} \Big| \left| C_{L\nu\lambda\rho}{}^\mu (\bar{u}_{Lt}^a \gamma^\rho d_{Lpa}) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} \nu_{Ls} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_5}^{a_2} \Big| \quad (5.125)$$

$$\mathcal{O}_{C_L d_L \bar{d}_L \bar{e}_R e_L D}^{(1,2)} \left| C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Lt}^a \gamma^\rho (D_\mu d_{Lpa})) (\bar{e}_{Rr} \sigma^{\nu\lambda} e_{Ls}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2} \Big| \left| C_{L\nu\lambda\rho}{}^\mu (\bar{d}_{Lt}^a \gamma^\rho d_{Lpa}) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} e_{Ls} \right) \right| \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_5}^{a_2} \Big| \quad (5.126)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L \nu \bar{\nu} D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{\nu}_{Lt} \gamma^\rho C \left(D_\mu \bar{d}_{Rp}^a \right) \right) \left(dL_{ra} C \sigma^{\nu\lambda} \nu_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{\nu}_{Lt} \gamma^\rho C \bar{d}_{Rp}^a \right) \left((D_\mu dL_{ra}) C \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_3}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_3}} \quad (5.127)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L \bar{e}_R e_R D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rs} \sigma^{\nu\lambda} dL_{ra} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rt} \right) \left(\bar{e}_{Rs} \sigma^{\nu\lambda} (D_\mu dL_{ra}) \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_3}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_3}} \quad (5.128)$$

$$\mathcal{O}_{C_L \bar{d}_R d_L e_L \bar{e}_L D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Lt} \gamma^\rho C \left(D_\mu \bar{d}_{Rp}^a \right) \right) \left(dL_{ra} C \sigma^{\nu\lambda} e_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Lt} \gamma^\rho C \bar{d}_{Rp}^a \right) \left((D_\mu dL_{ra}) C \sigma^{\nu\lambda} e_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_3}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_3}} \quad (5.129)$$

$$\mathcal{O}_{C_L \nu^2 \bar{u}_R u_R D}^{(1,2)} \left| \frac{\mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rta} \right) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right)}{\mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\left(D_\mu \bar{u}_{Rp}^a \right) \gamma^\rho u_{Rta} \right) \left(\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5}}{\mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_5}} \quad (5.130)$$

$$\mathcal{O}_{C_L \bar{d}_R \bar{e}_R \nu \bar{u}_R D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{e}_{Rp}) \gamma^\rho d_{Rta} \right) \left(\bar{u}_{Rr} \sigma^{\nu\lambda} \nu_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Rp} \gamma^\rho d_{Rta} \right) \left((D_\mu \bar{u}_{Rr}^a) \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_3}^{a_5}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_3}^{a_5}} \quad (5.131)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L \bar{u}_R u_R D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left((D_\mu \bar{e}_{Rp}) \gamma^\rho u_{Rta} \right) \left(\bar{u}_{Rs} \sigma^{\nu\lambda} e_{Lr} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Rp} \gamma^\rho u_{Rta} \right) \left(\bar{u}_{Rs} \sigma^{\nu\lambda} (D_\mu e_{Lr}) \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_4}^{a_5}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_4}^{a_5}} \quad (5.132)$$

$$\mathcal{O}_{C_L d_L \bar{e}_L \nu \bar{u}_R D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Lt} \gamma^\rho (D_\mu dL_{pa}) \right) \left(\bar{u}_{Rr} \sigma^{\nu\lambda} \nu_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{e}_{Lt} \gamma^\rho dL_{pa} \right) \left((D_\mu \bar{u}_{Rr}^a) \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_3}^{a_2}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_3}^{a_2}} \quad (5.133)$$

$$\mathcal{O}_{C_L d_L \bar{e}_R \bar{\nu} \bar{u}_R D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{\nu}_{Lt} \gamma^\rho (D_\mu dL_{pa}) \right) \left(\bar{e}_{Rr} \sigma^{\nu\lambda} C \bar{u}_{Rs}^a \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{\nu}_{Lt} \gamma^\rho dL_{pa} \right) \left((D_\mu \bar{e}_{Rr}) \sigma^{\nu\lambda} C \bar{u}_{Rs}^a \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_4}^{a_2}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_4}^{a_2}} \quad (5.134)$$

$$\mathcal{O}_{C_L \nu^2 u_L \bar{u}_L D}^{(1,2)} \left| \frac{\mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}^a \gamma^\rho u_{Lpa} \right) \left((D_\mu \nu_{Lr}) C \sigma^{\nu\lambda} \nu_{Ls} \right)}{\mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}^a \gamma^\rho (D_\mu u_{Lpa}) \right) \left(\nu_{Lr} C \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2}}{\mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_2}} \quad (5.135)$$

$$\mathcal{O}_{C_L \bar{d}_L e_L \nu u_L D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Lt}^a \gamma^\rho (D_\mu e_{Lp}) \right) \left(u_{Lra} C \sigma^{\nu\lambda} \nu_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Lt}^a \gamma^\rho e_{Lp} \right) \left((D_\mu u_{Lra}) C \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_3}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_5}^{a_3}} \quad (5.136)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L u_L \bar{u}_L D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}^a \gamma^\rho C (D_\mu \bar{e}_{Rp}) \right) \left(e_{Lr} C \sigma^{\nu\lambda} u_{Lsa} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}^a \gamma^\rho C \bar{e}_{Rp} \right) \left((D_\mu e_{Lr}) C \sigma^{\nu\lambda} u_{Lsa} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_5}^{a_4}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_5}^{a_4}} \quad (5.137)$$

$$\mathcal{O}_{C_L \bar{d}_R e_R \nu u_L D}^{(1,2)} \left| \frac{C_{L\nu\lambda\rho}^\mu \left(\left(D_\mu \bar{d}_{Rp}^a \right) \gamma^\rho e_{Rt} \right) \left(u_{Lra} C \sigma^{\nu\lambda} \nu_{Ls} \right)}{C_{L\nu\lambda\rho}^\mu \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rt} \right) \left((D_\mu u_{Lra}) C \sigma^{\nu\lambda} \nu_{Ls} \right)} \right| \frac{\mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_3}}{\mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_3}} \quad (5.138)$$

$$\mathcal{O}_{C_L \bar{u}_R u_L^2 \bar{u}_L D}^{(1 \sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline r & s \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}{}^b \gamma^\rho C \left(D_\mu \bar{u}_{Rp}^a \right) \right) \left(u_{Lrb} C \sigma^{\nu\lambda} u_{Lsa} \right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline r & s \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}{}^b \gamma^\rho C \bar{u}_{Rp}^a \right) \left((D_\mu u_{Lrb}) C \sigma^{\nu\lambda} u_{Lsa} \right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline s & r \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}{}^b \gamma^\rho C \left(D_\mu \bar{u}_{Rp}^a \right) \right) \left(u_{Lrb} C \sigma^{\nu\lambda} u_{Lsa} \right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline s & r \end{smallmatrix} \right] C_{L\nu\lambda\rho}^\mu \left(\bar{u}_{Lt}{}^b \gamma^\rho C \bar{u}_{Rp}^a \right) \left((D_\mu u_{Lrb}) C \sigma^{\nu\lambda} u_{Lsa} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \delta_{a_2}^{a_4} \delta_{a_5}^{a_3} \end{array} \quad (5.158)$$

$$\mathcal{O}_{C_L d_L^2 \nu u_R D}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline p & r \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (u_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) (d_{Lrb} C \sigma^{\nu\lambda} \nu_{Ls}) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline r & p \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (u_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) (d_{Lrb} C \sigma^{\nu\lambda} \nu_{Ls}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_5} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_5} \end{array} \quad (5.159)$$

$$\mathcal{O}_{C_L d_R d_L^2 \bar{e}_R D}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline r & s \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (\bar{e}_{Rs} \sigma^{\nu\lambda} d_{Lrb}) (d_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline s & r \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (\bar{e}_{Rs} \sigma^{\nu\lambda} d_{Lrb}) (d_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_5} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_5} \end{array} \quad (5.160)$$

$$\mathcal{O}_{C_L d_L^3 \bar{e}_L D} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s & r \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (\bar{e}_{Lt} \gamma^\rho (D_\mu d_{Lpa})) (d_{Lrb} C \sigma^{\nu\lambda} d_{Lsc}) \right| \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_4} \quad (5.161)$$

$$\mathcal{O}_{C_L d_R d_L \nu u_L D}^{(1,2)} \left| \begin{array}{l} \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (d_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) (u_{Lrb} C \sigma^{\nu\lambda} \nu_{Ls}) \\ \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (d_{Rtc} C \gamma^\rho d_{Lpa}) ((D_\mu u_{Lrb}) C \sigma^{\nu\lambda} \nu_{Ls}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_5} \\ \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \epsilon^{a_2 a_3 a_5} \end{array} \quad (5.162)$$

$$\mathcal{O}_{C_L d_L e_L u_R u_L D}^{(1,2)} \left| \begin{array}{l} \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (u_{Rtc} C \gamma^\rho (D_\mu d_{Lpa})) (e_{Lr} C \sigma^{\nu\lambda} u_{Lsb}) \\ \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (u_{Rtc} C \gamma^\rho d_{Lpa}) ((D_\mu e_{Lr}) C \sigma^{\nu\lambda} u_{Lsb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_4 a_5} \\ \mathcal{C}_{f_2, f_3, f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \epsilon^{a_2 a_4 a_5} \end{array} \quad (5.163)$$

$$\mathcal{O}_{C_L d_L^2 \bar{\nu} u_L D}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline p & r \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (\bar{\nu}_{Lt} \gamma^\rho (D_\mu d_{Lpa})) (d_{Lrb} C \sigma^{\nu\lambda} u_{Lsc}) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline r & p \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (\bar{\nu}_{Lt} \gamma^\rho (D_\mu d_{Lpa})) (d_{Lrb} C \sigma^{\nu\lambda} u_{Lsc}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_4} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_4} \end{array} \quad (5.164)$$

$$\mathcal{O}_{C_L d_R e_L u_L^2 D}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline s & t \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (d_{Rtc} C \gamma^\rho (D_\mu e_{Lp})) (u_{Lra} C \sigma^{\nu\lambda} u_{Lsb}) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline t & s \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (d_{Rtc} C \gamma^\rho e_{Lp}) ((D_\mu u_{Lra}) C \sigma^{\nu\lambda} u_{Lsb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \end{array} \quad (5.165)$$

$$\mathcal{O}_{C_L d_L e_R u_L^2 D}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline s & t \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (e_{Rt} C \gamma^\rho (D_\mu d_{Lpa})) (u_{Lrb} C \sigma^{\nu\lambda} u_{Lsc}) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline t & s \end{smallmatrix} \right] \epsilon^{abc} C_{L\nu\lambda\rho}^\mu (e_{Rt} C \gamma^\rho d_{Lpa}) ((D_\mu u_{Lrb}) C \sigma^{\nu\lambda} u_{Lsc}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_4} \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \epsilon^{a_2 a_3 a_4} \end{array} \quad (5.166)$$

Class $C_R^2 F_L \psi^2$: 6 types

$$\mathcal{O}_{C_R^2 F_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline p & r \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} F_{L\eta\xi} (\nu_{Lp} C \sigma^{\eta\xi} \nu_{Lr}) \right| \mathcal{C}_{f_2, f_3}^{[2]} [45]^4 \langle 12 \rangle \langle 13 \rangle \quad (5.167)$$

$$\mathcal{O}_{C_R^2 F_L \bar{e}_R e_L} \left| C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{e}_{Rp} \sigma^{\eta\xi} e_{Lr}) \right| \mathcal{C}_{f_2, f_3} [45]^4 \langle 12 \rangle \langle 13 \rangle \quad (5.168)$$

$$\mathcal{O}_{C_R^2 F_L \bar{d}_R d_L} \left| C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{d}_{Rp}^a \sigma^{\eta\xi} d_{Lra}) \right| \mathcal{C}_{f_2, f_3} [45]^4 \langle 12 \rangle \langle 13 \rangle \delta_{a_2}^{a_3} \quad (5.169)$$

$$\mathcal{O}_{C_R^2 F_L \bar{u}_R u_L} \left| C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} F_{L\eta\xi} (\bar{u}_{Rp}^a \sigma^{\eta\xi} u_{Lra}) \right| \mathcal{C}_{f_2, f_3} [45]^4 \langle 12 \rangle \langle 13 \rangle \delta_{a_2}^{a_3} \quad (5.170)$$

$$\mathcal{O}_{C_R^2 G_L \bar{d}_R d_L} \left| \lambda_a^{Ab} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A (\bar{d}_{Rp}^a \sigma^{\eta\xi} d_{Lrb}) \right| \mathcal{C}_{f_2, f_3} [45]^4 \langle 12 \rangle \langle 13 \rangle (\lambda^{A_1})_{a_2}^{a_3} \quad (5.171)$$

$$\mathcal{O}_{C_R^2 G_L \bar{u}_R u_L} \left| \lambda_a^{Ab} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} G_{L\eta\xi}^A (\bar{u}_{Rp}^a \sigma^{\eta\xi} u_{Lrb}) \right| \mathcal{C}_{f_2, f_3} [45]^4 \langle 12 \rangle \langle 13 \rangle (\lambda^{A_1})_{a_2}^{a_3} \quad (5.172)$$

5.6 Dim-10 operator and amplitude bases

Class $C_L F_L^3 D^2$: 2 types

$$\mathcal{O}_{C_L F_L G_L^2 D^2} \left| G_L^{A\lambda\rho} G_L^{A\xi\nu} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu F_{L\xi}^\eta) \right| s_{34} \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \delta^{A_3 A_4} \quad (5.173)$$

$$\mathcal{O}_{C_L G_L^3 D^2} \left| f^{ABC} G_L^{C\xi\nu} G_L^{B\xi\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu G_L^{A\rho\eta}) \right| s_{34} \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle f^{A_2 A_3 A_4} \quad (5.174)$$

Class $C_L^2 F_L^2 D^2$: 2 types

$$\mathcal{O}_{C_L^2 F_L^2 D^2}^{(1,2)} \left| \begin{array}{l} F_{L\xi\tau} F_L^{\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ F_L^{\nu\lambda} F_L^{\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \end{array} \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^2 \quad (5.175)$$

$$\mathcal{O}_{C_L^2 G_L^2 D^2}^{(1,2)} \left| \begin{array}{l} G_L^A \xi_\tau G_L^{A\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \\ G_L^{A\nu\lambda} G_L^{A\xi\tau} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \end{array} \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^2 \delta^{A_3 A_4} \quad (5.176)$$

Class $C_L^3 F_L D^2$: 1 types

$$\mathcal{O}_{C_L^3 F_L D^2} \left| F_L^{v\xi} C_{Lv}^{\tau\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_{L\xi\tau}^{\rho\eta}) \right| s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \langle 34 \rangle \quad (5.177)$$

Class $C_L^4 D^2$: 1 types

$$\mathcal{O}_{C_L^4 D^2} \left| C_{L\xi\tau\nu\varphi} C_L^{\xi\tau\nu\varphi} (D_\mu C_{L\nu\lambda\rho\eta}) (D^\mu C_L^{\nu\lambda\rho\eta}) \right| s_{34} \langle 12 \rangle^4 \langle 34 \rangle^4 \quad (5.178)$$

Class $C_L F_L^2 F_R D^2$: 2 types

$$\mathcal{O}_{C_L F_L G_L G_R D^2} \left| G_R^{A\xi\lambda} G_L^A \xi^\eta (D_\nu F_L^{\rho\mu}) (D_\mu C_{L\lambda\rho\eta}^\nu) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle \delta^{A_3 A_4} \quad (5.179)$$

$$\mathcal{O}_{C_L G_L^2 G_R D^2} \left| f^{ABC} G_R^{C\xi\lambda} G_L^B \xi^\eta (D_\nu G_L^{A\rho\mu}) (D_\mu C_{L\lambda\rho\eta}^\nu) \right| [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 23 \rangle f^{A_2 A_3 A_4} \quad (5.180)$$

Class $C_L^2 F_L F_R D^2$: 2 types

$$\mathcal{O}_{C_L^2 F_L F_R D^2} \left| C_L^{\rho\nu\xi\mu} F_R^{\tau\lambda} F_{L\tau}^\eta (D_\mu D_\nu C_{L\lambda\rho\eta}^\xi) \right| [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (5.181)$$

$$\mathcal{O}_{C_L^2 G_L G_R D^2} \left| C_L^{\rho\nu\xi\mu} G_R^{A\tau\lambda} G_L^A \tau^\eta (D_\mu D_\nu C_{L\lambda\rho\eta}^\xi) \right| [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{A_3 A_4} \quad (5.182)$$

Class $C_L F_L \psi \bar{\psi} D^3$: 11 types

$$\mathcal{O}_{C_L F_L \nu \bar{\nu} D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}^\nu) (\bar{\nu}_{Lr} \gamma^\eta \nu_{Lp}) \left((D_\nu D^\mu F_L^{\lambda\rho}) \right) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) (\bar{\nu}_{Lr} \gamma^\eta (D^\mu \nu_{Lp})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (5.183)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}^\nu) (\bar{e}_{Rp} \gamma^\eta e_{Rr}) (D_\nu D^\mu F_L^{\lambda\rho}) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) ((D^\mu \bar{e}_{Rp}) \gamma^\eta e_{Rr}) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (5.184)$$

$$\mathcal{O}_{C_L F_L e_L \bar{e}_L D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}^\nu) ((\bar{e}_{Lr} \gamma^\eta e_{Lp})) (D_\nu D^\mu F_L^{\lambda\rho}) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}^\nu) (\bar{e}_{Lr} \gamma^\eta (D^\mu e_{Lp})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \quad (5.185)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{d}_{Rp}^a \gamma^\eta d_{Rra}) (D_\nu D^\mu F_L^{\lambda\rho}) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) ((D^\mu \bar{d}_{Rp}^a) \gamma^\eta d_{Rra}) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_3}^{a_4} \right| \quad (5.186)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}{}^\nu) ((\bar{d}_{Lr}^a \gamma^\eta d_{Lpa})) (D_\nu D^\mu F_L^{\lambda\rho}) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{d}_{Lr}^a \gamma^\eta (D^\mu d_{Lpa})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_4}^{a_3} \right| \quad (5.187)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R u_R D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Rp}^a \gamma^\eta u_{Rra}) (D_\nu D^\mu F_L^{\lambda\rho}) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) ((D^\mu \bar{u}_{Rp}^a) \gamma^\eta u_{Rra}) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_3}^{a_4} \right| \quad (5.188)$$

$$\mathcal{O}_{C_L F_L u_L \bar{u}_L D^3}^{(1,2)} \left| \begin{array}{l} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Lr}^a \gamma^\eta u_{Lpa}) ((D_\nu D^\mu F_L^{\lambda\rho})) \\ (D_\nu F_L^{\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Lr}^a \gamma^\eta (D^\mu u_{Lpa})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \delta_{a_4}^{a_3} \right| \quad (5.189)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R d_R D^3}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{d}_{Rp}^a \gamma^\eta d_{Rrb}) (D_\nu D^\mu G_L^{A\lambda\rho}) \\ \lambda_a^{Ab} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) ((D^\mu \bar{d}_{Rp}^a) \gamma^\eta d_{Rrb}) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4} \right| \quad (5.190)$$

$$\mathcal{O}_{C_L G_L d_L \bar{d}_L D^3}^{(1,2)} \left| \begin{array}{l} \lambda_b^{Aa} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{d}_{Lr}^b \gamma^\eta d_{Lpa}) (D_\nu D^\mu G_L^{A\lambda\rho}) \\ \lambda_b^{Aa} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{d}_{Lr}^b \gamma^\eta (D^\mu d_{Lpa})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_4}^{a_3} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_4}^{a_3} \right| \quad (5.191)$$

$$\mathcal{O}_{C_L G_L \bar{u}_R u_R D^3}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Rp}^a \gamma^\eta u_{Rrb}) (D_\nu D^\mu G_L^{A\lambda\rho}) \\ \lambda_a^{Ab} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) ((D^\mu \bar{u}_{Rp}^a) \gamma^\eta u_{Rrb}) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_3}^{a_4} \right| \quad (5.192)$$

$$\mathcal{O}_{C_L G_L u_L \bar{u}_L D^3}^{(1,2)} \left| \begin{array}{l} \lambda_b^{Aa} (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Lr}^b \gamma^\eta u_{Lpa}) (D_\nu D^\mu G_L^{A\lambda\rho}) \\ \lambda_b^{Aa} (D_\nu G_L^{A\lambda\rho}) (D_\mu C_{L\lambda\rho\eta}{}^\nu) (\bar{u}_{Lr}^b \gamma^\eta (D^\mu u_{Lpa})) \end{array} \right| \mathcal{C}_{f_3, f_4} [34] s_{34} \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_4}^{a_3} \left| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_2})_{a_4}^{a_3} \right| \quad (5.193)$$

Class $C_L^2 \psi \bar{\psi} D^3$: 7 types

$$\mathcal{O}_{C_L^2 \nu \bar{\nu} D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) (\bar{\nu}_{Lr} \gamma^\nu (D^\mu \nu_{Lp})) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \left| \quad (5.194)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) ((D^\mu \bar{e}_{Rp}) \gamma^\nu e_{Rr}) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \left| \quad (5.195)$$

$$\mathcal{O}_{C_L^2 e_L \bar{e}_L D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) (\bar{e}_{Lr} \gamma^\nu (D^\mu e_{Lp})) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \left| \quad (5.196)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) ((D^\mu \bar{d}_{Rp}^a) \gamma^\nu d_{Rra}) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_3}^{a_4} \left| \quad (5.197)$$

$$\mathcal{O}_{C_L^2 d_L \bar{d}_L D^3} \left| C_L^{\lambda\rho\eta\xi} (D_\mu D_\nu C_{L\lambda\rho\eta\xi}) (\bar{d}_{Lr}^a \gamma^\nu (D^\mu d_{Lpa})) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_4}^{a_3} \left| \quad (5.198)$$

$$\mathcal{O}_{C_L^2 \bar{u}_R u_R D^3} \left| C_L^{\lambda \rho \eta \xi} (D_\mu D_\nu C_{L \lambda \rho \eta \xi}) \left((D^\mu \bar{u}_{R p}^a) \gamma^\nu u_{R r a} \right) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.199)$$

$$\mathcal{O}_{C_L^2 u_L \bar{u}_L D^3} \left| C_L^{\lambda \rho \eta \xi} (D_\mu D_\nu C_{L \lambda \rho \eta \xi}) (\bar{u}_{L r}^a \gamma^\nu (D^\mu u_{L p a})) \right| \mathcal{C}_{f_3, f_4} [34]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_4}^{a_3} \Big| \quad (5.200)$$

Class $C_R^2 F_L^2 D^2$: 2 types

$$\mathcal{O}_{C_R^2 F_L^2 D^2} \left| C_{R \rho \eta \xi \tau} C_R^{\rho \eta \xi \tau} (D_\mu F_{L \nu \lambda}) (D^\mu F_L^{\nu \lambda}) \right| [34]^4 s_{34} \langle 12 \rangle^2 \Big| \quad (5.201)$$

$$\mathcal{O}_{C_R^2 G_L^2 D^2} \left| C_{R \rho \eta \xi \tau} C_R^{\rho \eta \xi \tau} (D_\mu G_{L \nu \lambda}^A) (D^\mu G_L^{A \nu \lambda}) \right| [34]^4 s_{34} \langle 12 \rangle^2 \delta^{A_1 A_2} \Big| \quad (5.202)$$

Class $C_R F_L^2 F_R D^2$: 2 types

$$\mathcal{O}_{C_R F_L G_L G_R D^2} \left| C_R^{\eta \xi \rho \lambda} G_{R \eta \xi}^A (D_\mu F_{L \lambda}^\nu) (D_\nu G_{L \rho}^A) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle \delta^{A_2 A_3} \Big| \quad (5.203)$$

$$\mathcal{O}_{C_R G_L^2 G_R D^2} \left| f^{ABC} C_R^{\eta \xi \rho \lambda} G_{R \eta \xi}^C (D_\mu G_{L \lambda}^\nu) (D_\nu G_{L \rho}^B) \right| [34]^4 \langle 12 \rangle \langle 13 \rangle \langle 23 \rangle f^{A_1 A_2 A_3} \Big| \quad (5.204)$$

Class $C_L C_R F_L F_R D^2$: 2 types

$$\mathcal{O}_{C_L C_R F_L F_R D^2} \left| C_R^{\xi \tau \eta \lambda} F_{R \xi \tau} C_{L \lambda}^\nu{}_\rho{}^\mu (D_\mu D_\nu F_{L \eta}^\rho) \right| [34]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \Big| \quad (5.205)$$

$$\mathcal{O}_{C_L C_R G_L G_R D^2} \left| C_R^{\xi \tau \eta \lambda} G_{R \xi \tau}^A C_{L \lambda}^\nu{}_\rho{}^\mu (D_\mu D_\nu G_{L \eta}^A) \right| [34]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \Big| \quad (5.206)$$

Class $C_L^2 C_R^2 D^2$: 1 types

$$\mathcal{O}_{C_L^2 C_R^2 D^2} \left| C_{R \xi \tau \nu \varphi} C_R^{\xi \tau \nu \varphi} (D_\mu C_{L \nu \lambda \rho \eta}) (D^\mu C_L^{\nu \lambda \rho \eta}) \right| [34]^4 s_{34} \langle 12 \rangle^4 \Big| \quad (5.207)$$

Class $C_R F_L \psi \bar{\psi} D^3$: 11 types

$$\mathcal{O}_{C_R F_L \bar{\nu} \nu D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) (\bar{\nu}_{L r} \gamma^\eta (D_\lambda D_\nu \nu_{L p})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \Big| \quad (5.208)$$

$$\mathcal{O}_{C_R F_L \bar{e}_R e_R D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) ((D_\lambda D_\nu \bar{e}_{R p}) \gamma^\eta e_{R r}) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \Big| \quad (5.209)$$

$$\mathcal{O}_{C_R F_L e_L \bar{e}_L D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) (\bar{e}_{L r} \gamma^\eta (D_\lambda D_\nu e_{L p})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \Big| \quad (5.210)$$

$$\mathcal{O}_{C_R F_L \bar{d}_R d_R D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) \left((D_\lambda D_\nu \bar{d}_{R p}^a) \gamma^\eta d_{R r a} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_2}^{a_3} \Big| \quad (5.211)$$

$$\mathcal{O}_{C_R F_L d_L \bar{d}_L D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) (\bar{d}_{L r}^a \gamma^\eta (D_\lambda D_\nu d_{L p a})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_3}^{a_2} \Big| \quad (5.212)$$

$$\mathcal{O}_{C_R F_L \bar{u}_R u_R D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) \left((D_\lambda D_\nu \bar{u}_{R p}^a) \gamma^\eta u_{R r a} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_2}^{a_3} \Big| \quad (5.213)$$

$$\mathcal{O}_{C_R F_L u_L \bar{u}_L D^3} \left| C_{R \eta}^{\rho \lambda \mu} (D_\mu F_{L \rho}^\nu) (\bar{u}_{L r}^a \gamma^\eta (D_\lambda D_\nu u_{L p a})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \delta_{a_3}^{a_2} \Big| \quad (5.214)$$

$$\mathcal{O}_{C_R G_L \bar{d}_R d_R D^3} \left| \lambda^{A b}{}_a C_{R \eta}^{\rho \lambda \mu} (D_\mu G_{L \rho}^A) \left((D_\lambda D_\nu \bar{d}_{R p}^a) \gamma^\eta d_{R r b} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \left(\lambda^{A_1} \right)_{a_2}^{a_3} \Big| \quad (5.215)$$

$$\mathcal{O}_{C_R G_L d_L \bar{d}_L D^3} \left| \lambda^{A a}{}_b C_{R \eta}^{\rho \lambda \mu} (D_\mu G_{L \rho}^A) (\bar{d}_{L r}^b \gamma^\eta (D_\lambda D_\nu d_{L p a})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \left(\lambda^{A_1} \right)_{a_3}^{a_2} \Big| \quad (5.216)$$

$$\mathcal{O}_{C_R G_L \bar{u}_R u_R D^3} \left| \lambda^{A b}{}_a C_{R \eta}^{\rho \lambda \mu} (D_\mu G_{L \rho}^A) \left((D_\lambda D_\nu \bar{u}_{R p}^a) \gamma^\eta u_{R r b} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \left(\lambda^{A_1} \right)_{a_2}^{a_3} \Big| \quad (5.217)$$

$$\mathcal{O}_{C_R G_L u_L \bar{u}_L D^3} \left| \lambda^{A a}{}_b C_{R \eta}^{\rho \lambda \mu} (D_\mu G_{L \rho}^A) (\bar{u}_{L r}^b \gamma^\eta (D_\lambda D_\nu u_{L p a})) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 13 \rangle^2 \langle 23 \rangle \left(\lambda^{A_1} \right)_{a_3}^{a_2} \Big| \quad (5.218)$$

Class $C_L C_R \psi \bar{\psi} D^3$: 7 types

$$\mathcal{O}_{C_L C_R \nu \bar{\nu} D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left(\bar{\nu}_{Lr} \gamma^{\xi} (D_{\lambda} D_{\mu} D_{\nu} \nu_{Lp}) \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \quad (5.219)$$

$$\mathcal{O}_{C_L C_R \bar{e}_R e_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left((D_{\lambda} D_{\mu} D_{\nu} \bar{e}_{Rp}) \gamma^{\xi} e_{Rr} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \quad (5.220)$$

$$\mathcal{O}_{C_L C_R e_L \bar{e}_L D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left(\bar{e}_{Lr} \gamma^{\xi} (D_{\lambda} D_{\mu} D_{\nu} e_{Lp}) \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \quad (5.221)$$

$$\mathcal{O}_{C_L C_R \bar{d}_R d_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left((D_{\lambda} D_{\mu} D_{\nu} \bar{d}_{Rp}^a) \gamma^{\xi} d_{Rra} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \quad (5.222)$$

$$\mathcal{O}_{C_L C_R d_L \bar{d}_L D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left(\bar{d}_{Lr}^a \gamma^{\xi} (D_{\lambda} D_{\mu} D_{\nu} d_{Lpa}) \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_3}^{a_2} \quad (5.223)$$

$$\mathcal{O}_{C_L C_R \bar{u}_R u_R D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left((D_{\lambda} D_{\mu} D_{\nu} \bar{u}_{Rp}^a) \gamma^{\xi} u_{Rra} \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_2}^{a_3} \quad (5.224)$$

$$\mathcal{O}_{C_L C_R u_L \bar{u}_L D^3} \left| C_{R\xi}^{\rho\lambda\eta} C_{L\rho}^{\nu}{}_{\eta}{}^{\mu} \left(\bar{u}_{Lr}^a \gamma^{\xi} (D_{\lambda} D_{\mu} D_{\nu} u_{Lpa}) \right) \right| \mathcal{C}_{f_2, f_3} [34]^4 \langle 12 \rangle \langle 13 \rangle^3 \delta_{a_3}^{a_2} \quad (5.225)$$

Class $C_L F_L^4$: 4 types

$$\mathcal{O}_{C_L F_L^4} \left| C_{L\mu\nu\lambda\rho} F_{L\eta\xi} F_L^{\eta\xi} F_L^{\lambda\rho} F_L^{\mu\nu} \right| \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \quad (5.226)$$

$$\mathcal{O}_{C_L F_L^2 G_L^2}^{(1\sim 3)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} F_L^{\mu\nu} G_L^A{}_{\eta\xi} G_L^{A\eta\xi} \\ C_{L\mu\nu\lambda\rho} F_{L\eta\xi} F_L^{\lambda\rho} G_L^{A\eta\xi} G_L^{A\mu\nu} \\ C_{L\mu\nu\lambda\rho} G_L^{A\nu\lambda} G_L^{A\xi\mu} F_{L\eta}{}^{\rho} F_{L\xi}{}^{\eta} \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 25 \rangle \langle 35 \rangle \delta^{A_4 A_5} \end{array} \quad (5.227)$$

$$\mathcal{O}_{C_L F_L G_L^3}^{(1,2)} \left| \begin{array}{l} d^{ABC} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} G_L^B{}_{\eta\xi} G_L^{C\eta\xi} \\ d^{ABC} C_{L\mu\nu\lambda\rho} F_{L\eta\xi} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_L^{C\eta\xi} \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 d^{A_3 A_4 A_5} \\ \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle^2 d^{A_3 A_4 A_5} \end{array} \quad (5.228)$$

$$\mathcal{O}_{C_L G_L^4}^{(1\sim 3)} \left| \begin{array}{l} d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_L^C{}_{\eta\xi} G_L^{D\eta\xi} \\ d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^B{}_{\eta\xi} G_L^{C\mu\nu} G_L^{D\eta\xi} \\ f^{ABE} f^{CDE} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{D\xi\eta} G_L^B{}_{\eta}{}^{\nu} G_L^C{}_{\xi}{}^{\mu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 45 \rangle^2 d^{EA_2 A_3} d^{EA_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 d^{EA_2 A_3} d^{EA_4 A_5} \\ \langle 12 \rangle^2 \langle 14 \rangle^2 \langle 35 \rangle^2 f^{EA_2 A_3} f^{EA_4 A_5} \end{array} \quad (5.229)$$

Class $C_L^2 F_L^3$: 2 types

$$\mathcal{O}_{C_L^2 F_L G_L^2} \left| C_{L\mu\nu\lambda\rho} G_L^{A\xi\mu} G_L^{A\tau\eta} C_{L\eta\xi}{}^{\lambda\rho} F_{L\tau}{}^{\nu} \right| \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \langle 25 \rangle^2 \delta^{A_4 A_5} \quad (5.230)$$

$$\mathcal{O}_{C_L^2 G_L^3} \left| f^{ABC} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^A{}_{\eta\xi} G_L^{C\tau\eta} G_L^B{}_{\tau}{}^{\xi} \right| \langle 12 \rangle^4 \langle 34 \rangle \langle 35 \rangle \langle 45 \rangle f^{A_3 A_4 A_5} \quad (5.231)$$

Class $C_L^3 F_L^2$: 2 types

$$\mathcal{O}_{C_L^3 F_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} F_{L\tau\nu} F_L^{\tau\nu} C_{L\eta\xi}{}^{\lambda\rho} \\ C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} F_L^{\eta\xi} F_L^{\tau\nu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \\ \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2 \end{array} \quad (5.232)$$

$$\mathcal{O}_{C_L^3 G_L^2}^{(1,2)} \left| \begin{array}{l} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} G_L^A{}_{\tau\nu} G_L^{A\tau\nu} C_{L\eta\xi}{}^{\lambda\rho} \\ C_{L\eta\xi\tau\nu} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} G_L^{A\eta\xi} G_L^{A\tau\nu} \end{array} \right| \begin{array}{l} \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \delta^{A_4 A_5} \\ \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \langle 45 \rangle^2 \delta^{A_4 A_5} \end{array} \quad (5.233)$$

Class C_L^5 : 1 types

$$\mathcal{O}_{C_L^5} \left| C_{L\mu\nu\lambda\rho} C_{L\tau\nu\varphi\chi} C_L^{\mu\nu\eta\xi} C_L^{\tau\nu\varphi\chi} C_{L\eta\xi}{}^{\lambda\rho} \right| \langle 12 \rangle^4 \langle 34 \rangle^2 \langle 35 \rangle^2 \langle 45 \rangle^2 \quad (5.234)$$

Class $C_L F_L^2 \psi \bar{\psi} D$: 18 types

$$\mathcal{O}_{C_L F_L^2 \nu \bar{\nu} D}^{(1,2)} \left| \begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_{\mu} C_{L\nu\lambda\rho\eta}) (\bar{\nu}_{Lr} \gamma^{\mu} \nu_{Lp}) \\ F_L^{\eta\nu} C_{L\nu\lambda\rho}{}^{\mu} (D_{\mu} F_{L\eta}{}^{\lambda}) (\bar{\nu}_{Lr} \gamma^{\rho} \nu_{Lp}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \end{array} \quad (5.235)$$

$$\mathcal{O}_{\bar{C}_L F_L^2 \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ F_L^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \end{array} \quad (5.236)$$

$$\mathcal{O}_{\bar{C}_L F_L^2 e_L \bar{e}_L D}^{(1,2)} \left| \frac{F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Lr} \gamma^\mu e_{Lp})}{F_L^{\eta\nu} C_{L\nu\lambda\rho} \mu \left(D_\mu F_{L\eta}^\lambda \right) (\bar{e}_{Lr} \gamma^\rho e_{Lp})} \right| \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \quad (5.237)$$

$$\mathcal{O}_{C_L F_L^2 \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Rp}^a \gamma^\mu d_{Rra} \right) \\ F_L^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rra} \right) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \end{array} \right| \quad (5.238)$$

$$\mathcal{O}_{C_L F_L^2 d_L \bar{d}_L D}^{(1,2)} \left| \begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Lr}{}^a \gamma^\mu d_{Lpa} \right) \\ F_L^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) \left(\bar{d}_{Lr}{}^a \gamma^\rho d_{Lpa} \right) \end{array} \right| \left| \begin{array}{l} C_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_5}^{a_4} \\ C_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_5}^{a_4} \end{array} \right| \quad (5.239)$$

$$\mathcal{O}_{C_L F_L^2 \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rra}) \\ F_L^{\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_4}^{a_5} \end{array} \right| \quad (5.240)$$

$$\mathcal{O}_{C_L F_L^2 u_L \bar{u}_L D}^{(1,2)} \left[\begin{array}{l} F_L^{\nu\lambda} F_L^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}{}^a \gamma^\mu u_{Lpa}) \\ F_L^{\eta\mu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) (\bar{u}_{Lr}{}^a \gamma^\rho u_{Lpa}) \end{array} \right] \left[\begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta_{a_5}^{a_4} \end{array} \right] \quad (5.241)$$

$$\mathcal{O}_{C_L F_L G_L \bar{d}_R d_R D}^{(1\sim 4)} \left| \begin{array}{l} \lambda_a^{Ab} F_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{R\rho}^a \gamma^\mu d_{Rr b} \right) \\ \lambda_a^{Ab} G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu \left(D_\mu F_{L\eta}{}^\lambda \right) \left(\bar{d}_{R\rho}^a \gamma^\rho d_{Rr b} \right) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu F_L^{\rho\eta}) \left(\bar{d}_{R\rho}^a \gamma^\mu d_{Rr b} \right) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho}{}^\mu F_{L\eta}{}^\lambda \left(D_\mu G_L^{A\eta\nu} \right) \left(\bar{d}_{R\rho}^a \gamma^\rho d_{Rr b} \right) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \left(\lambda^{A_3} \right)_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \left(\lambda^{A_3} \right)_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \left(\lambda^{A_3} \right)_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \left(\lambda^{A_3} \right)_{a_4}^{a_5} \end{array} \right| \quad (5.242)$$

$$\mathcal{O}_{C_L F_L G_L d_L \bar{d}_L D}^{(1\sim 4)} \left| \begin{array}{l} \lambda^A{}_b F_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) \left(\bar{d}_{Lr}{}^b \gamma^\mu dL_{pa} \right) \\ \lambda^A{}_b G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) \left(\bar{d}_{Lr}{}^b \gamma^\rho dL_{pa} \right) \\ \lambda^A{}_b C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu F_L^{\rho\eta}) \left(\bar{d}_{Lr}{}^b \gamma^\mu dL_{pa} \right) \\ \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu F_{L\eta}{}^\lambda (D_\mu G_L^{A\eta\nu}) \left(\bar{d}_{Lr}{}^b \gamma^\rho dL_{pa} \right) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \left(\lambda^{A_3} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \left(\lambda^{A_3} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle \left(\lambda^{A_3} \right)_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle \left(\lambda^{A_3} \right)_{a_5}^{a_4} \end{array} \right| \quad (5.243)$$

$$\mathcal{O}_{C_L F_L G_L \bar{u}_R u_R D}^{(1\sim 4)} \left| \begin{array}{l} \lambda_a^{Ab} F_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ \lambda_a^{Ab} G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu F_L^{\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ \lambda_a^{Ab} C_{L\nu\lambda\rho}{}^\mu F_{L\eta}{}^\lambda (D_\mu G_L^{A\eta\nu}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \end{array} \right| \quad (5.244)$$

$$\mathcal{O}_{C_L F_L G_L u_L \bar{u}_L D}^{(1\sim 4)} \left| \begin{array}{l} \lambda^A{}_b F_L^{\rho\eta} G_L^{A\nu\lambda} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}{}^b \gamma^\mu u_{Lpa}) \\ \lambda^A{}_b G_L^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu F_{L\eta}{}^\lambda) (\bar{u}_{Lr}{}^b \gamma^\rho u_{Lpa}) \\ \lambda^A{}_b C_{L\nu\lambda\rho\eta} G_L^{A\nu\lambda} (D_\mu F_L^{\rho\eta}) (\bar{u}_{Lr}{}^b \gamma^\mu u_{Lpa}) \\ \lambda^A{}_b C_{L\nu\lambda\rho}{}^\mu F_{L\eta}{}^\lambda (D_\mu G_L^{A\eta\nu}) (\bar{u}_{Lr}{}^b \gamma^\rho u_{Lpa}) \end{array} \right| \left| \begin{array}{l} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle \langle 13 \rangle^3 \langle 24 \rangle (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle \langle 13 \rangle^2 \langle 14 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_5}^{a_4} \end{array} \right| \quad (5.245)$$

$$\mathcal{O}_{\bar{C}_L \bar{G}_L^2 \nu \bar{\nu} D}^{(1,2)} \left| \begin{array}{c} G_L^{\Lambda \nu \lambda} G_L^{A \rho \eta} (D_\mu C_{L \nu \lambda \rho \eta}) (\bar{\nu}_{Lr} \gamma^\mu \nu_{Lp}) \\ G_L^{A \eta \nu} C_{L \nu \lambda \rho}^\mu (D_\mu G_{L \eta}^\lambda) (\bar{\nu}_{Lr} \gamma^\rho \nu_{Lp}) \end{array} \right| \begin{array}{c} \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 34 \rangle \delta^{A_2 A_3} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \langle 34 \rangle \delta^{A_2 A_3} \end{array} \quad (5.246)$$

Class $C_L^2 F_L \psi \bar{\psi} D$: 11 types

$$\mathcal{O}_{C_L^2 F_L \nu \bar{\nu} D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{\nu}_{Lr} \gamma^\mu \nu_{Lp}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{\nu}_{Lr} \gamma^\xi \nu_{Lp}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{\nu}_{Lr} \gamma^\rho \nu_{Lp}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \end{array} \quad (5.253)$$

$$\mathcal{O}_{C_L^2 F_L \bar{e}_R e_R D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\mu e_{Rr}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\xi e_{Rr}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{e}_{Rp} \gamma^\rho e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \end{array} \quad (5.254)$$

$$\mathcal{O}_{C_L^2 F_L e_L \bar{e}_L D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Lr} \gamma^\mu e_{Lp}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Lr} \gamma^\xi e_{Lp}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{e}_{Lr} \gamma^\rho e_{Lp}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \end{array} \quad (5.255)$$

$$\mathcal{O}_{C_L^2 F_L \bar{d}_R d_R D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rra}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\xi d_{Rra}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_4}^{a_5} \end{array} \quad (5.256)$$

$$\mathcal{O}_{C_L^2 F_L d_L \bar{d}_L D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}^a \gamma^\mu d_{Lpa}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}^a \gamma^\xi d_{Lpa}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{d}_{Lr}^a \gamma^\rho d_{Lpa}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_5}^{a_4} \end{array} \quad (5.257)$$

$$\mathcal{O}_{C_L^2 F_L \bar{u}_R u_R D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rra}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\xi u_{Rra}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_4}^{a_5} \end{array} \quad (5.258)$$

$$\mathcal{O}_{C_L^2 F_L u_L \bar{u}_L D}^{(1\sim 3)} \left| \begin{array}{l} F_L^{\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}^a \gamma^\mu u_{Lpa}) \\ F_L^{\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}^a \gamma^\xi u_{Lpa}) \\ C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu F_L^{\eta\xi}) (\bar{u}_{Lr}^a \gamma^\rho u_{Lpa}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle \delta_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 \delta_{a_5}^{a_4} \end{array} \quad (5.259)$$

$$\mathcal{O}_{C_L^2 G_L \bar{d}_R d_R D}^{(1\sim 3)} \left| \begin{array}{l} \lambda_a^{Ab} G_L^{A\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\mu d_{Rrb}) \\ \lambda_a^{Ab} G_L^{A\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}^a \gamma^\xi d_{Rrb}) \\ \lambda_a^{Ab} C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\eta\xi}) (\bar{d}_{Rp}^a \gamma^\rho d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 (\lambda^{A_3})_{a_4}^{a_5} \end{array} \quad (5.260)$$

$$\mathcal{O}_{C_L^2 G_L d_L \bar{d}_L D}^{(1\sim 3)} \left| \begin{array}{l} \lambda_b^{Aa} G_L^{A\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}^b \gamma^\mu d_{Lpa}) \\ \lambda_b^{Aa} G_L^{A\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}^b \gamma^\xi d_{Lpa}) \\ \lambda_b^{Aa} C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\eta\xi}) (\bar{d}_{Lr}^b \gamma^\rho d_{Lpa}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 (\lambda^{A_3})_{a_5}^{a_4} \end{array} \quad (5.261)$$

$$\mathcal{O}_{C_L^2 G_L \bar{u}_R u_R D}^{(1\sim 3)} \left| \begin{array}{l} \lambda_a^{Ab} G_L^{A\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\mu u_{Rrb}) \\ \lambda_a^{Ab} G_L^{A\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}^a \gamma^\xi u_{Rrb}) \\ \lambda_a^{Ab} C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\eta\xi}) (\bar{u}_{Rp}^a \gamma^\rho u_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_4}^{a_5} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 (\lambda^{A_3})_{a_4}^{a_5} \end{array} \quad (5.262)$$

$$\mathcal{O}_{C_L^2 G_L u_L \bar{u}_L D}^{(1\sim 3)} \left| \begin{array}{l} \lambda_b^{Aa} G_L^{A\xi\nu} C_{L\xi}^{\lambda\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}^b \gamma^\mu u_{Lpa}) \\ \lambda_b^{Aa} G_L^{A\nu\lambda} C_{L\xi}^{\rho\eta} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}^b \gamma^\xi u_{Lpa}) \\ \lambda_b^{Aa} C_{L\eta\xi}^{\nu\lambda} C_{L\nu\lambda\rho}^\mu (D_\mu G_L^{A\eta\xi}) (\bar{u}_{Lr}^b \gamma^\rho u_{Lpa}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^4 \langle 34 \rangle^2 (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [35] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle \langle 24 \rangle (\lambda^{A_3})_{a_5}^{a_4} \\ \mathcal{C}_{f_4, f_5} [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 24 \rangle^2 (\lambda^{A_3})_{a_5}^{a_4} \end{array} \quad (5.263)$$

Class $C_L \psi^4 D^2$: 18 types

$$\mathcal{O}_{C_L \nu^4 D^2}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{|c|c|c|} \hline p & r & s \\ \hline t & & \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} \nu_{Ls} C \nu_{Lt} \left((D_\mu \nu_{Lp}) C \sigma^{\lambda\rho} (D_\nu \nu_{Lr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|c|} \hline p & r & s \\ \hline t & & \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} \nu_{Ls} C \nu_{Lt} \left((D_\mu \nu_{Lp}) C \sigma^{\lambda\rho} (D_\nu \nu_{Lr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|c|} \hline p & r & s \\ \hline s & t & \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} \nu_{Ls} C \nu_{Lt} \left((D_\mu \nu_{Lp}) C \sigma^{\lambda\rho} (D_\nu \nu_{Lr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|c|} \hline p & r & s \\ \hline s & t & \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu \nu_{Ls}) C \nu_{Lt}) \left((D_\mu \nu_{Lp}) C \sigma^{\lambda\rho} \nu_{Lr} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2 f_3 f_4 f_5}^{[4]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3 f_4 f_5}^{[3,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3 f_4 f_5}^{[2,2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3 f_4 f_5}^{[2,1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \end{array} \quad (5.264)$$

$$\mathcal{O}_{C_L \bar{e}_R e_L \nu^2 D^2}^{(1\sim 9)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} \nu_{Ls} C \nu_{Lt} \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} (D_\nu e_{Lr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) e_{Lr}) \left((D_\nu \nu_{Ls}) C \sigma^{\lambda\rho} \nu_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} (\bar{e}_{Rp} (D_\mu e_{Lr})) \left((D_\nu \nu_{Ls}) C \sigma^{\lambda\rho} \nu_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \sigma^{\rho\eta} e_{Lr}) \left((D^\mu \nu_{Ls}) C \sigma^{\nu\lambda} \nu_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) \sigma_\eta^\rho e_{Lr}) \left((D_\nu \nu_{Ls}) C \sigma^{\eta\lambda} \nu_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu \nu_{Ls}) C \nu_{Lt}) \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} e_{Lr} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu \nu_{Ls}) C \nu_{Lt}) \left(\bar{e}_{Rp} \sigma^{\lambda\rho} (D_\mu e_{Lr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) (D_\nu e_{Lr})) \left(\nu_{Ls} C \sigma^{\lambda\rho} \nu_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|} \hline s \\ \hline t \\ \hline \end{array} \right] (D_\mu C_{L\nu\lambda\rho\eta}) (\nu_{Ls} C \sigma^{\nu\lambda} \nu_{Lt}) \left((D^\mu \bar{e}_{Rp}) \sigma^{\rho\eta} e_{Lr} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [45] \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \langle 35 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [34] \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[2]} [45] \langle 13 \rangle \langle 14 \rangle^2 \langle 15 \rangle \langle 25 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} s_{45} \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle \langle 15 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \\ \mathcal{C}_{f_2, f_3, f_4, f_5}^{[1,1]} [34] \langle 13 \rangle^2 \langle 14 \rangle^2 \langle 25 \rangle \end{array} \quad (5.265)$$

$$\mathcal{O}_{C_L \bar{e}_R^2 e_L^2 D^2}^{(1\sim 9)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} e_{Ls} C e_{Lt} \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} C (D_\nu \bar{e}_{Rr}) \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) C \bar{e}_{Rr}) \left((D_\nu e_{Ls}) C \sigma^{\lambda\rho} e_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu e_{Ls}) C \sigma^{\eta\lambda} e_{Lt}) \left((D_\mu \bar{e}_{Rp}) \sigma_\eta^\rho C \bar{e}_{Rr} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu e_{Ls}) C e_{Lt}) \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] (D_\mu C_{L\nu\lambda\rho\eta}) (e_{Ls} C \sigma^{\nu\lambda} e_{Lt}) \left((D^\mu \bar{e}_{Rp}) \sigma^{\rho\eta} C \bar{e}_{Rr} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) C \bar{e}_{Rr}) \left((D_\nu e_{Ls}) C \sigma^{\lambda\rho} e_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \sigma^{\rho\eta} C \bar{e}_{Rr}) \left((D^\mu e_{Ls}) C \sigma^{\nu\lambda} e_{Lt} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\nu e_{Ls}) C e_{Lt}) \left((D_\mu \bar{e}_{Rp}) \sigma^{\lambda\rho} C \bar{e}_{Rr} \right) \\ \mathcal{Y} \left[\begin{array}{|c|c|} \hline p & r \\ \hline s & t \\ \hline \end{array} \right] C_{L\lambda\rho}^{\nu\mu} ((D_\mu \bar{e}_{Rp}) C (D_\nu \bar{e}_{Rr})) \left(e_{Ls} C \sigma^{\lambda\rho} e_{Lt} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[2]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[2]} [45] \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \langle 35 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[2]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[2],[1,1]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[2]} [45] \langle 12 \rangle \langle 14 \rangle^2 \langle 15 \rangle \langle 35 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[2]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[1,1]} [35] \langle 12 \rangle \langle 13 \rangle^2 \langle 15 \rangle \langle 45 \rangle \\ \mathcal{C}_{f_2 f_3, f_4 f_5}^{[1,1],[1,1]} [34] \langle 12 \rangle \langle 13 \rangle \langle 14 \rangle^2 \langle 35 \rangle \end{array} \quad (5.266)$$

$$\mathcal{O}_{C_L F_L G_L G_R^2} \left| d^{ABC} C_{L\mu\nu\lambda\rho} F_L^{\lambda\rho} G_L^{A\mu\nu} G_R^{B\eta\xi} G_R^{C\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{A_3 A_4 A_5} \quad (5.289)$$

$$\mathcal{O}_{C_L F_R G_L^2 G_R} \left| d^{ABC} C_{L\mu\nu\lambda\rho} F_R^{\eta\xi} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_R^{C\eta\xi} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{A_2 A_3 A_5} \quad (5.290)$$

$$\mathcal{O}_{C_L G_L^2 G_R^2}^{(1\sim 3)} \left| \begin{array}{l} d^{ABE} d^{CDE} C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_R^{C\eta\xi} G_R^{D\eta\xi} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{A\mu\nu} G_R^{C\eta\xi} G_R^{C\eta\xi} \\ C_{L\mu\nu\lambda\rho} G_L^{A\lambda\rho} G_L^{B\mu\nu} G_R^{A\eta\xi} G_R^{B\eta\xi} \end{array} \right| \begin{array}{l} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 d^{E A_2 A_3} d^{E A_4 A_5} \\ [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_3} \delta^{A_4 A_5} \\ [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_4} \delta^{A_3 A_5} \end{array} \quad (5.291)$$

Class $C_L^3 C_R^2$: 1 types

$$\mathcal{O}_{C_L^3 C_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} C_{R\tau\nu\varphi\chi} C_R^{\tau\nu\varphi\chi} C_{L\eta\xi}^{\lambda\rho} \right| [45]^4 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (5.292)$$

Class $C_L^3 F_R^2$: 2 types

$$\mathcal{O}_{C_L^3 F_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} F_{R\tau\nu} F_R^{\tau\nu} C_{L\eta\xi}^{\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \quad (5.293)$$

$$\mathcal{O}_{C_L^3 G_R^2} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\eta\xi} G_{R\tau\nu}^A G_R^{A\tau\nu} C_{L\eta\xi}^{\lambda\rho} \right| [45]^2 \langle 12 \rangle^2 \langle 13 \rangle^2 \langle 23 \rangle^2 \delta^{A_4 A_5} \quad (5.294)$$

Class $C_L F_L F_R \psi \bar{\psi} D$: 22 types

$$\mathcal{O}_{C_L F_L F_R \nu \bar{\nu} D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{\nu}_{Lr} \gamma^\lambda \nu_{Lp}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{\nu}_{Lr} \gamma^\lambda (D_\mu \nu_{Lp})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \end{array} \quad (5.295)$$

$$\mathcal{O}_{C_L F_L F_R \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{e}_{Rp} \gamma^\lambda e_{Rr}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho ((D_\mu \bar{e}_{Rp}) \gamma^\lambda e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \end{array} \quad (5.296)$$

$$\mathcal{O}_{C_L F_L F_R e_L \bar{e}_L D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{e}_{Lr} \gamma^\lambda e_{Lp}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{e}_{Lr} \gamma^\lambda (D_\mu e_{Lp})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \end{array} \quad (5.297)$$

$$\mathcal{O}_{C_L F_L F_R \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rra}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho ((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \end{array} \quad (5.298)$$

$$\mathcal{O}_{C_L F_L F_R d_L \bar{d}_L D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{d}_{Lr}^a \gamma^\lambda d_{Lpa}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{d}_{Lr}^a \gamma^\lambda (D_\mu d_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \end{array} \quad (5.299)$$

$$\mathcal{O}_{C_L F_L F_R \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rra}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho ((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \end{array} \quad (5.300)$$

$$\mathcal{O}_{C_L F_L F_R u_L \bar{u}_L D}^{(1,2)} \left| \begin{array}{l} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{u}_{Lr}^a \gamma^\lambda u_{Lpa}) \\ F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{u}_{Lr}^a \gamma^\lambda (D_\mu u_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \end{array} \quad (5.301)$$

$$\mathcal{O}_{C_L F_L G_R \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} \lambda_a^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ \lambda_a^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho ((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_5})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_5})_{a_3}^{a_4} \end{array} \quad (5.302)$$

$$\mathcal{O}_{C_L F_L G_R d_L \bar{d}_L D}^{(1,2)} \left| \begin{array}{l} \lambda_b^{Aa} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{d}_{Lr}^b \gamma^\lambda d_{Lpa}) \\ \lambda_b^{Aa} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{d}_{Lr}^b \gamma^\lambda (D_\mu d_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_5})_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_5})_{a_4}^{a_3} \end{array} \quad (5.303)$$

$$\mathcal{O}_{C_L F_L G_R \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} \lambda^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb}) \\ \lambda^{Ab} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho \left((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rrb} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_5})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_5})_{a_3}^{a_4} \end{array} \quad (5.304)$$

$$\mathcal{O}_{C_L F_L G_R u_L \bar{u}_L D}^{(1,2)} \left| \begin{array}{l} \lambda^{Aa} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu F_{L\eta}^\rho) (\bar{u}_{Lr}^b \gamma^\lambda u_{Lpa}) \\ \lambda^{Aa} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu F_{L\eta}^\rho (\bar{u}_{Lr}^b \gamma^\lambda (D_\mu u_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_5})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_5})_{a_4}^{a_3} \end{array} \quad (5.305)$$

$$\mathcal{O}_{C_L F_R G_L \bar{d}_R d_R D}^{(1,2)} \left| \begin{array}{l} \lambda^{Ab} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ \lambda^{Ab} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A \left((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4} \end{array} \quad (5.306)$$

$$\mathcal{O}_{C_L F_R G_L d_L \bar{d}_L D}^{(1,2)} \left| \begin{array}{l} \lambda^{Aa} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{d}_{Lr}^b \gamma^\lambda d_{Lpa}) \\ \lambda^{Aa} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A (\bar{d}_{Lr}^b \gamma^\lambda (D_\mu d_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_4}^{a_3} \end{array} \quad (5.307)$$

$$\mathcal{O}_{C_L F_R G_L \bar{u}_R u_R D}^{(1,2)} \left| \begin{array}{l} \lambda^{Ab} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{u}_{Rp}^a \gamma^\lambda u_{Rrb}) \\ \lambda^{Ab} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A \left((D_\mu \bar{u}_{Rp}^a) \gamma^\lambda u_{Rrb} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_3}^{a_4} \end{array} \quad (5.308)$$

$$\mathcal{O}_{C_L F_R G_L u_L \bar{u}_L D}^{(1,2)} \left| \begin{array}{l} \lambda^{Aa} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{u}_{Lr}^b \gamma^\lambda u_{Lpa}) \\ \lambda^{Aa} F_R^{\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A (\bar{u}_{Lr}^b \gamma^\lambda (D_\mu u_{Lpa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle (\lambda^{A_2})_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 (\lambda^{A_2})_{a_4}^{a_3} \end{array} \quad (5.309)$$

$$\mathcal{O}_{C_L G_L G_R \nu \bar{\nu} D}^{(1,2)} \left| \begin{array}{l} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{\nu}_{Lr} \gamma^\lambda \nu_{Lp}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A (\bar{\nu}_{Lr} \gamma^\lambda (D_\mu \nu_{Lp})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_5} \end{array} \quad (5.310)$$

$$\mathcal{O}_{C_L G_L G_R \bar{e}_R e_R D}^{(1,2)} \left| \begin{array}{l} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{e}_{Rp} \gamma^\lambda e_{Rr}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A ((D_\mu \bar{e}_{Rp}) \gamma^\lambda e_{Rr}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_5} \end{array} \quad (5.311)$$

$$\mathcal{O}_{C_L G_L G_R e_L \bar{e}_L D}^{(1,2)} \left| \begin{array}{l} G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{e}_{Lr} \gamma^\lambda e_{Lp}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A (\bar{e}_{Lr} \gamma^\lambda (D_\mu e_{Lp})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta^{A_2 A_5} \end{array} \quad (5.312)$$

$$\mathcal{O}_{C_L G_L G_R \bar{d}_R d_R D}^{(1\sim 6)} \left| \begin{array}{l} d^{ABC} \lambda^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ d^{ABC} \lambda^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A \left((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb} \right) \\ f^{ABC} \lambda^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rrb}) \\ f^{ABC} \lambda^{Cb} G_R^{B\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A \left((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rrb} \right) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu (D_\mu G_{L\eta}^A) (\bar{d}_{Rp}^a \gamma^\lambda d_{Rra}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}^\mu G_{L\eta}^A \left((D_\mu \bar{d}_{Rp}^a) \gamma^\lambda d_{Rra} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle f^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 f^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_3}^{a_4} \delta^{A_2 A_5} \end{array} \quad (5.313)$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L G_R d_L \bar{d}_L D}^{(1\sim 6)} & \left| \begin{array}{l} d^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{d}_{Lr}{}^b \gamma^\lambda d L_{pa}) \\ d^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{d}_{Lr}{}^b \gamma^\lambda (D_\mu d L_{pa})) \\ f^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{d}_{Lr}{}^b \gamma^\lambda d L_{pa}) \\ f^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{d}_{Lr}{}^b \gamma^\lambda (D_\mu d L_{pa})) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{d}_{Lr}{}^a \gamma^\lambda d L_{pa}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{d}_{Lr}{}^a \gamma^\lambda (D_\mu d L_{pa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle f^{CA_2 A_5} (\lambda^C)_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 f^{CA_2 A_5} (\lambda^C)_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \delta^{A_2 A_5} \end{array} \right| \quad (5.314)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L G_R \bar{u}_R u_R D}^{(1\sim 6)} & \left| \begin{array}{l} d^{ABC} \lambda^C{}_a G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Rp}{}^a \gamma^\lambda u_{Rrb}) \\ d^{ABC} \lambda^C{}_a G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho ((D_\mu \bar{u}_{Rp}{}^a) \gamma^\lambda u_{Rrb}) \\ f^{ABC} \lambda^C{}_a G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Rp}{}^a \gamma^\lambda u_{Rrb}) \\ f^{ABC} \lambda^C{}_a G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho ((D_\mu \bar{u}_{Rp}{}^a) \gamma^\lambda u_{Rrb}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Rp}{}^a \gamma^\lambda u_{Rra}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho ((D_\mu \bar{u}_{Rp}{}^a) \gamma^\lambda u_{Rra}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle f^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 f^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \delta^{A_2 A_5} \end{array} \right| \quad (5.315)
 \end{aligned}$$

$$\begin{aligned}
 \mathcal{O}_{C_L G_L G_R u_L \bar{u}_L D}^{(1\sim 6)} & \left| \begin{array}{l} d^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Lr}{}^b \gamma^\lambda u L_{pa}) \\ d^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{u}_{Lr}{}^b \gamma^\lambda (D_\mu u L_{pa})) \\ f^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Lr}{}^b \gamma^\lambda u L_{pa}) \\ f^{ABC} \lambda^C{}_b G_R^{B\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{u}_{Lr}{}^b \gamma^\lambda (D_\mu u L_{pa})) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu (D_\mu G_L^A{}_{\eta}{}^\rho) (\bar{u}_{Lr}{}^a \gamma^\lambda u L_{pa}) \\ G_R^{A\eta\nu} C_{L\nu\lambda\rho}{}^\mu G_L^A{}_{\eta}{}^\rho (\bar{u}_{Lr}{}^a \gamma^\lambda (D_\mu u L_{pa})) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 d^{CA_2 A_5} (\lambda^C)_{a_3}^{a_4} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle f^{CA_2 A_5} (\lambda^C)_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 f^{CA_2 A_5} (\lambda^C)_{a_4}^{a_3} \\ \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \delta^{A_2 A_5} \\ \mathcal{C}_{f_3, f_4} [35] [45] \langle 12 \rangle^2 \langle 13 \rangle^2 \delta_{a_4}^{a_3} \delta^{A_2 A_5} \end{array} \right| \quad (5.316)
 \end{aligned}$$

Class $C_L^2 F_R \psi \bar{\psi} D$: 11 types

$$\mathcal{O}_{C_L^2 F_R \nu \bar{\nu} D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{\nu}_{Lr} \gamma^\eta \nu_{Lp}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \quad (5.317)$$

$$\mathcal{O}_{C_L^2 F_R \bar{e}_R e_R D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Rp} \gamma^\eta e_{Rr}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \quad (5.318)$$

$$\mathcal{O}_{C_L^2 F_R e_L \bar{e}_L D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{e}_{Lr} \gamma^\eta e_{Lp}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \quad (5.319)$$

$$\mathcal{O}_{C_L^2 F_R \bar{d}_R d_R D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}{}^a \gamma^\eta d_{Rra}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.320)$$

$$\mathcal{O}_{C_L^2 F_R d_L \bar{d}_L D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}{}^a \gamma^\eta d L_{pa}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \quad (5.321)$$

$$\mathcal{O}_{C_L^2 F_R \bar{u}_R u_R D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}{}^a \gamma^\eta u_{Rra}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.322)$$

$$\mathcal{O}_{C_L^2 F_R u_L \bar{u}_L D} \left| F_R^{\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}{}^a \gamma^\eta u L_{pa}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \quad (5.323)$$

$$\mathcal{O}_{C_L^2 G_R \bar{d}_R d_R D} \left| \lambda^A{}_b G_R^{A\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Rp}{}^a \gamma^\eta d_{Rrb}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle (\lambda^{A_5})_{a_3}^{a_4} \quad (5.324)$$

$$\mathcal{O}_{C_L^2 G_R d_L \bar{d}_L D} \left| \lambda^A{}_b G_R^{A\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{d}_{Lr}{}^b \gamma^\eta d L_{pa}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle (\lambda^{A_5})_{a_4}^{a_3} \quad (5.325)$$

$$\mathcal{O}_{C_L^2 G_R \bar{u}_R u_R D} \left| \lambda^A{}_a G_R^{A\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Rp}{}^a \gamma^\eta u_{Rrb}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle (\lambda^{A_5})_{a_3}^{a_4} \quad (5.326)$$

$$\mathcal{O}_{C_L^2 G_R u_L \bar{u}_L D} \left| \lambda^A{}_b G_R^{A\xi\nu} C_{L\xi}{}^{\rho\lambda\mu} (D_\mu C_{L\nu\lambda\rho\eta}) (\bar{u}_{Lr}{}^b \gamma^\eta u L_{pa}) \right| \mathcal{C}_{f_3, f_4} [45]^2 \langle 12 \rangle^4 \langle 34 \rangle (\lambda^{A_5})_{a_4}^{a_3} \quad (5.327)$$

$$\mathcal{O}_{C_L F_L e_R \bar{e}_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Lt} \gamma^\lambda \nu_{Lr} \right) \left(\nu_{Lp} C \gamma^\rho e_{Rs} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.452)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.453)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R^2 e_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{e}_{Rr} \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.454)$$

$$\mathcal{O}_{C_L F_L e_L \bar{e}_L \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.455)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_L \bar{\nu}^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda e_{Lr} \right) \left(\bar{e}_{Rp} \gamma^\rho C \bar{\nu}_{Ls} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.456)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Lt} \gamma^\lambda e_{Lr} \right) \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.457)$$

$$\mathcal{O}_{C_L F_L e_L^2 \bar{e}_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{e}_{Lt} \gamma^\lambda e_{Lr} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \right| \quad (5.458)$$

$$\mathcal{O}_{C_L F_L d_R \bar{d}_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Lt}^a \gamma^\lambda \nu_{Lr} \right) \left(\nu_{Lp} C \gamma^\rho d_{Rsa} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} \right| \quad (5.459)$$

$$\mathcal{O}_{C_L F_L \nu^2 u_R \bar{u}_L} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Lt}^a \gamma^\lambda \nu_{Lr} \right) \left(\nu_{Lp} C \gamma^\rho u_{Rsa} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} \right| \quad (5.460)$$

$$\mathcal{O}_{C_L F_L d_R \bar{e}_R \nu \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho d_{Rsa} \right) \left(\bar{u}_{Lt}^a \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} \right| \quad (5.461)$$

$$\mathcal{O}_{C_L F_L \bar{d}_L e_L \nu u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho e_{Lp} \right) \left(\nu_{Lr} C \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \right| \quad (5.462)$$

$$\mathcal{O}_{C_L F_L d_R \bar{d}_L \bar{e}_R e_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho d_{Rsa} \right) \left(\bar{d}_{Lt}^a \gamma^\lambda e_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} \right| \quad (5.463)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_L u_R \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Lt}^a \gamma^\lambda e_{Lr} \right) \left(\bar{e}_{Rp} \gamma^\rho u_{Rsa} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_5} \right| \quad (5.464)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \right| \quad (5.465)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R e_R \nu u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\nu_{Lr} C \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_6} \right| \quad (5.466)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R \bar{e}_R e_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{e}_{Rr} \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \right| \quad (5.467)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{e}_{Lt} \gamma^\lambda e_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \right| \quad (5.468)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R e_L \bar{\nu} u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda e_{Lr} \right) \left(\bar{d}_{Rp}^a \gamma^\rho u_{Rsa} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \right| \quad (5.469)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho d_{Lpa} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \right| \quad (5.470)$$

$$\mathcal{O}_{C_L F_L d_L \bar{e}_L \nu \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho d_{Lpa} \right) \left(\bar{u}_{Lt}^a \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_3} \right| \quad (5.471)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L \bar{e}_R e_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho d_{Lpa} \right) \left(\bar{e}_{Rr} \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \Big| \quad (5.472)$$

$$\mathcal{O}_{C_L F_L d_L \bar{e}_R \bar{\nu}_{\bar{u}_L}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Ls}^a \gamma^\rho d_{Lpa} \right) \left(\bar{e}_{Rr} \gamma^\lambda C \bar{\nu}_{Lt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \Big| \quad (5.473)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho d_{Lpa} \right) \left(\bar{e}_{Lt} \gamma^\lambda e_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \Big| \quad (5.474)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_L \bar{\nu}^2} \left| \mathcal{Y} \left[\overline{\text{st}} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda d_{Lra} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{\nu}_{Ls} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.475)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_L e_R \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Lt} \gamma^\lambda d_{Lra} \right) \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rs} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.476)$$

$$\mathcal{O}_{C_L F_L d_R \bar{e}_L \nu_{\bar{u}_R}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{e}_{Lt} \gamma^\lambda \nu_{Lr} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \Big| \quad (5.477)$$

$$\mathcal{O}_{C_L F_L \nu \bar{\nu} \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \Big| \quad (5.478)$$

$$\mathcal{O}_{C_L F_L d_R \bar{e}_R \bar{\nu} \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho d_{Rsa} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda C \bar{\nu}_{Lt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_5} \Big| \quad (5.479)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_6} \Big| \quad (5.480)$$

$$\mathcal{O}_{C_L F_L e_L \bar{e}_L \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rta} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_6} \Big| \quad (5.481)$$

$$\mathcal{O}_{C_L F_L d_L \bar{e}_L \bar{\nu} \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho d_{Lpa} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda C \bar{\nu}_{Lt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_4}^{a_3} \Big| \quad (5.482)$$

$$\mathcal{O}_{C_L F_L \bar{d}_L e_R \nu_{u_L}} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho u_{Lpa} \right) \left(\nu_{Lr} C \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \Big| \quad (5.483)$$

$$\mathcal{O}_{C_L F_L \nu \bar{\nu} u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \left(\bar{u}_{Ls}^a \gamma^\rho u_{Lpa} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \Big| \quad (5.484)$$

$$\mathcal{O}_{C_L F_L \bar{e}_R e_R u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{u}_{Lt}^a \gamma^\lambda u_{Lra} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_4} \Big| \quad (5.485)$$

$$\mathcal{O}_{C_L F_L \bar{d}_L e_L \bar{\nu} u_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho e_{Lp} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lra} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_4} \Big| \quad (5.486)$$

$$\mathcal{O}_{C_L F_L e_L \bar{e}_L u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{u}_{Lt}^a \gamma^\lambda u_{Lra} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_4} \Big| \quad (5.487)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R e_R \bar{\nu} u_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lra} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.488)$$

$$\mathcal{O}_{C_L F_L \bar{\nu}^2 \bar{u}_R u_L} \left| \mathcal{Y} \left[\overline{\text{st}} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lra} \right) \left(\bar{u}_{Rp}^a \gamma^\rho C \bar{\nu}_{Ls} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.489)$$

$$\mathcal{O}_{C_L F_L e_R \bar{e}_L \bar{u}_R u_L} \left| C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\bar{e}_{Lt} \gamma^\lambda u_{Lra} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \Big| \quad (5.490)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R^2 u_R}^{(1,2)} \left| \frac{\mathcal{Y} \left[\begin{smallmatrix} [p, r], [s] \\ [t] \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb} \right)}{\mathcal{Y} \left[\begin{smallmatrix} [p] \\ [r], [s, t] \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda u_{Rtb} \right)} \right| \frac{\mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [1, 1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6}}{\mathcal{C}_{f_3 f_4, f_5 f_6}^{[1, 1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6}} \quad (5.507)$$

$$\mathcal{O}_{C_L F_L \bar{d}_R d_R u_L \bar{u}_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lrb} \right)}{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho d_{Rsc} \right) \left(\bar{u}_{Lt}^c \gamma^\lambda u_{Lra} \right)} \right| \frac{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4}}{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta_{a_6}^{a_5}} \quad (5.508)$$

$$\mathcal{O}_{C_L F_L d_L \bar{d}_L u_L \bar{u}_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^a \gamma^\rho d_{Lpa} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lrb} \right)}{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{d}_{Ls}^b \gamma^\rho d_{Lpa} \right) \left(\bar{u}_{Lt}^a \gamma^\lambda u_{Lrb} \right)} \right| \frac{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \delta_{a_6}^{a_4}}{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_6}^{a_3} \delta_{a_5}^{a_4}} \quad (5.509)$$

$$\mathcal{O}_{C_L F_L d_R \bar{d}_L \bar{u}_R u_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho d_{Rsa} \right) \left(\bar{d}_{Lt}^b \gamma^\lambda u_{Lrb} \right)}{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho d_{Rsc} \right) \left(\bar{d}_{Lt}^c \gamma^\lambda u_{Lra} \right)} \right| \frac{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \delta_{a_6}^{a_4}}{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta_{a_6}^{a_5}} \quad (5.510)$$

$$\mathcal{O}_{C_L F_L \bar{u}_R u_R u_L \bar{u}_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lrb} \right) \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsa} \right)}{C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Lt}^c \gamma^\lambda u_{Lra} \right) \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rsc} \right)} \right| \frac{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4}}{\mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_3}^{a_4} \delta_{a_6}^{a_5}} \quad (5.511)$$

$$\mathcal{O}_{C_L F_L u_L^2 \bar{u}_L^2}^{(1,2)} \left| \frac{\mathcal{Y} \left[\begin{smallmatrix} [p, r], [s] \\ [t] \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Ls}^a \gamma^\rho u_{Lpa} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lrb} \right)}{\mathcal{Y} \left[\begin{smallmatrix} [p] \\ [r], [s, t] \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{u}_{Ls}^a \gamma^\rho u_{Lpa} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lrb} \right)} \right| \frac{\mathcal{C}_{f_3 f_4, f_5 f_6}^{[2], [1, 1]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \delta_{a_6}^{a_4}}{\mathcal{C}_{f_3 f_4, f_5 f_6}^{[1, 1], [2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \delta_{a_5}^{a_3} \delta_{a_6}^{a_4}} \quad (5.512)$$

$$\mathcal{O}_{C_L F_L d_R d_L \nu u_R} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(d_{Lpa} C \gamma^\rho d_{Rsb} \right) \left(\nu_{Lr} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_5 a_6} \quad (5.513)$$

$$\mathcal{O}_{C_L F_L d_R^2 d_L \bar{e}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} [p] \\ [r] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Rr} \gamma^\lambda d_{Rtc} \right) \left(d_{Lpa} C \gamma^\rho d_{Rsb} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_5 a_6} \quad (5.514)$$

$$\mathcal{O}_{C_L F_L d_L e_L u_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} [s] \\ [t] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(d_{Lpa} C \gamma^\rho u_{Rsb} \right) \left(e_{Lr} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_5 a_6} \quad (5.515)$$

$$\mathcal{O}_{C_L F_L d_R d_L^2 \bar{e}_L} \left| \mathcal{Y} \left[\begin{smallmatrix} [r, s] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{e}_{Lt} \gamma^\lambda d_{Lrb} \right) \left(d_{Lpa} C \gamma^\rho d_{Rsc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \quad (5.516)$$

$$\mathcal{O}_{C_L F_L d_L^2 \bar{\nu} u_R} \left| \mathcal{Y} \left[\begin{smallmatrix} [p, r] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda d_{Lrb} \right) \left(d_{Lpa} C \gamma^\rho u_{Rsc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \quad (5.517)$$

$$\mathcal{O}_{C_L F_L d_R^2 \nu u_L} \left| \mathcal{Y} \left[\begin{smallmatrix} [p] \\ [r] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(u_{Lpa} C \gamma^\rho d_{Rsb} \right) \left(\nu_{Lr} C \gamma^\lambda d_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_5 a_6} \quad (5.518)$$

$$\mathcal{O}_{C_L F_L d_R e_L u_R u_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(e_{Lp} C \gamma^\rho d_{Rsb} \right) \left(u_{Lra} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_4 a_5 a_6} \quad (5.519)$$

$$\mathcal{O}_{C_L F_L d_R d_L \bar{\nu} u_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lrb} \right) \left(d_{Lpa} C \gamma^\rho d_{Rsc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \quad (5.520)$$

$$\mathcal{O}_{C_L F_L d_L e_R u_R u_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(d_{Lpa} C \gamma^\rho e_{Rs} \right) \left(u_{Lrb} C \gamma^\lambda u_{Rtc} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_4 a_6} \quad (5.521)$$

$$\mathcal{O}_{C_L F_L d_R e_R u_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} [s, t] \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} F_L^{\mu\nu} \left(u_{Lpa} C \gamma^\rho d_{Rsc} \right) \left(u_{Lrb} C \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3 f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon^{a_3 a_4 a_5} \quad (5.522)$$

$$\mathcal{O}_{C_L G_L \nu \bar{\nu} u_R u_R} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \left(\bar{u}_{Rp}^a \gamma^\rho u_{Rs b} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_3}^{a_5} \Big| \quad (5.542)$$

$$\mathcal{O}_{C_L G_L d_R \bar{e}_R \bar{\nu} \bar{u}_R} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho d_{Rs b} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda C \bar{\nu}_{Lt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_5} \Big| \quad (5.543)$$

$$\mathcal{O}_{C_L G_L \bar{e}_R e_R \bar{u}_R u_R} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rt b} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_6} \Big| \quad (5.544)$$

$$\mathcal{O}_{C_L G_L e_L \bar{e}_L \bar{u}_R u_R} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{u}_{Rr}^a \gamma^\lambda u_{Rt b} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_6} \Big| \quad (5.545)$$

$$\mathcal{O}_{C_L G_L d_L \bar{e}_L \bar{\nu} \bar{u}_R} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho d_{Lp a} \right) \left(\bar{u}_{Rr}^b \gamma^\lambda C \bar{\nu}_{Lt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_4}^{a_3} \Big| \quad (5.546)$$

$$\mathcal{O}_{C_L G_L \bar{d}_L e_R \nu u_L} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Ls}^b \gamma^\rho u_{Lp a} \right) \left(\nu_{Lr} C \gamma^\lambda e_{Rt} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_5}^{a_3} \Big| \quad (5.547)$$

$$\mathcal{O}_{C_L G_L \nu \bar{\nu} u_L \bar{u}_L} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda \nu_{Lr} \right) \left(\bar{u}_{Ls}^b \gamma^\rho u_{Lp a} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_5}^{a_3} \Big| \quad (5.548)$$

$$\mathcal{O}_{C_L G_L \bar{e}_R e_R u_L \bar{u}_L} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Rp} \gamma^\rho e_{Rs} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lr a} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_6}^{a_4} \Big| \quad (5.549)$$

$$\mathcal{O}_{C_L G_L \bar{d}_L e_L \bar{\nu} u_L} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Ls}^b \gamma^\rho e_{Lp} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lr a} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_5}^{a_4} \Big| \quad (5.550)$$

$$\mathcal{O}_{C_L G_L e_L \bar{e}_L u_L \bar{u}_L} \left| \lambda_b^{Aa} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{e}_{Ls} \gamma^\rho e_{Lp} \right) \left(\bar{u}_{Lt}^b \gamma^\lambda u_{Lr a} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_6}^{a_4} \Big| \quad (5.551)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R e_R \bar{\nu} u_L} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lr b} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_3}^{a_4} \Big| \quad (5.552)$$

$$\mathcal{O}_{C_L G_L \bar{\nu}^2 \bar{u}_R u_L} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{\nu}_{Lt} \gamma^\lambda u_{Lr b} \right) \left(\bar{u}_{Rp}^a \gamma^\rho C \bar{\nu}_{Ls} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_3}^{a_4} \Big| \quad (5.553)$$

$$\mathcal{O}_{C_L G_L e_R \bar{e}_L \bar{u}_R u_L} \left| \lambda_a^{Ab} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{u}_{Rp}^a \gamma^\rho e_{Rs} \right) \left(\bar{e}_{Lt} \gamma^\lambda u_{Lr b} \right) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \left(\lambda^{A_2} \right)_{a_3}^{a_4} \Big| \quad (5.554)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R \bar{d}_L \nu \bar{u}_L}^{(1,2)} \left| \begin{array}{l} \lambda_b^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{u}_{Lt}^c \gamma^\lambda \nu_{Lr} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^b \right) \\ \lambda_a^{Ad} \epsilon_{bcd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{u}_{Lt}^c \gamma^\lambda \nu_{Lr} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^b \right) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{a_3 a_6 d} \left(\lambda^{A_2} \right)_{a_5}^d \Big| \quad (5.555)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R \bar{e}_R \bar{u}_L^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] \lambda_b^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{u}_{Ls}^b \right) \left(\bar{e}_{Rr} \gamma^\lambda C \bar{u}_{Lt}^c \right) \\ \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] \lambda_a^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{u}_{Ls}^b \right) \left(\bar{e}_{Rr} \gamma^\lambda C \bar{u}_{Lt}^c \right) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{a_3 a_6 d} \left(\lambda^{A_2} \right)_{a_5}^d \Big| \quad (5.556)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R \bar{d}_L^2 e_L}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline \end{smallmatrix} \right] \lambda_b^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Lt}^c \gamma^\lambda e_{Lr} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^b \right) \\ \mathcal{Y} \left[\begin{smallmatrix} r & s \\ \hline \end{smallmatrix} \right] \lambda_a^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Lt}^c \gamma^\lambda e_{Lr} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^b \right) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{a_3 a_6 d} \left(\lambda^{A_2} \right)_{a_5}^d \Big| \quad (5.557)$$

$$\mathcal{O}_{C_L G_L \bar{d}_R^2 \bar{d}_L e_R}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline \end{smallmatrix} \right] \lambda_b^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Rr}^b \gamma^\lambda e_{Rt} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^c \right) \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline \end{smallmatrix} \right] \lambda_a^{Ad} \epsilon_{acd} C_{L\mu\nu\lambda\rho} G_L^{A\mu\nu} \left(\bar{d}_{Rr}^b \gamma^\lambda e_{Rt} \right) \left(\bar{d}_{Rp}^a \gamma^\rho C \bar{d}_{Ls}^c \right) \end{array} \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^2 \langle 13 \rangle \langle 14 \rangle \epsilon_{a_3 a_5 d} \left(\lambda^{A_2} \right)_{a_4}^d \Big| \quad (5.558)$$

$$\mathcal{O}_{C_L^2 e_L \bar{e}_L \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta e_{Lp}) (\bar{\nu}_{Lt} \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \quad (5.591)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_L \bar{\nu}^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta e_{Lr}) (\bar{e}_{Rp} \gamma_\eta C \bar{\nu}_{Ls}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \quad (5.592)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Lt} \gamma^\eta e_{Lr}) (\bar{e}_{Rp} \gamma_\eta e_{Rs}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \quad (5.593)$$

$$\mathcal{O}_{C_L^2 e_L^2 \bar{e}_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r, & s & t \\ \hline \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta e_{Lp}) (\bar{e}_{Lt} \gamma^\eta e_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2], [2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \quad (5.594)$$

$$\mathcal{O}_{C_L^2 d_R \bar{d}_L \nu^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Lt}^a \gamma^\eta \nu_{Lr}) (\nu_{Lp} C \gamma_\eta d_{Rsa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_5} \quad (5.595)$$

$$\mathcal{O}_{C_L^2 \nu^2 u_R \bar{u}_L} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Lt}^a \gamma^\eta \nu_{Lr}) (\nu_{Lp} C \gamma_\eta u_{Rsa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_5} \quad (5.596)$$

$$\mathcal{O}_{C_L^2 d_R \bar{e}_R \nu \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta d_{Rsa}) (\bar{u}_{Lt}^a \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_5} \quad (5.597)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L e_L \nu u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta e_{Lp}) (\nu_{Lr} C \gamma^\eta u_{Rta}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_6} \quad (5.598)$$

$$\mathcal{O}_{C_L^2 d_R \bar{d}_L \bar{e}_R e_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta d_{Rsa}) (\bar{d}_{Lt}^a \gamma^\eta e_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_5} \quad (5.599)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_L u_R \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Lt}^a \gamma^\eta e_{Lr}) (\bar{e}_{Rp} \gamma_\eta u_{Rsa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_5} \quad (5.600)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta d_{Rsa}) (\bar{\nu}_{Lt} \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.601)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R e_R \nu u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta e_{Rs}) (\nu_{Lr} C \gamma^\eta u_{Rta}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_6} \quad (5.602)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R \bar{e}_R e_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta d_{Rsa}) (\bar{e}_{Rr} \gamma^\eta e_{Rt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.603)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta d_{Rsa}) (\bar{e}_{Lt} \gamma^\eta e_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.604)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R e_L \bar{\nu} u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta e_{Lr}) (\bar{d}_{Rp}^a \gamma_\eta u_{Rsa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.605)$$

$$\mathcal{O}_{C_L^2 d_L \bar{d}_L \nu \bar{\nu}} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta d_{Lpa}) (\bar{\nu}_{Lt} \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.606)$$

$$\mathcal{O}_{C_L^2 d_L \bar{e}_L \nu \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta d_{Lpa}) (\bar{u}_{Lt}^a \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_3} \quad (5.607)$$

$$\mathcal{O}_{C_L^2 d_L \bar{d}_L \bar{e}_R e_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta d_{Lpa}) (\bar{e}_{Rr} \gamma^\eta e_{Rt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.608)$$

$$\mathcal{O}_{C_L^2 d_L \bar{e}_R \bar{\nu} \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Ls}^a \gamma_\eta d_{Lpa}) (\bar{e}_{Rr} \gamma^\eta C \bar{\nu}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.609)$$

$$\mathcal{O}_{C_L^2 d_L \bar{d}_L e_L \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta d_{Lpa}) (\bar{e}_{Lt} \gamma^\eta e_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.610)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_L \bar{\nu}^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta d_{Lra}) (\bar{d}_{Rp}^a \gamma_\eta C \bar{\nu}_{Ls}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.611)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_L e_R \bar{e}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Lt} \gamma^\eta d_{Lra}) (\bar{d}_{Rp}^a \gamma_\eta e_{Rs}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \quad (5.612)$$

$$\mathcal{O}_{C_L^2 d_R \bar{e}_L \nu \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Rp}^a \gamma_\eta d_{Rsa}) (\bar{e}_{Lt} \gamma^\eta \nu_{Lr}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.613)$$

$$\mathcal{O}_{C_L^2 \nu \bar{\nu} \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta \nu_{Lr}) (\bar{u}_{Rp}^a \gamma_\eta u_{Rsa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \quad (5.614)$$

$$\mathcal{O}_{C_L^2 d_R \bar{e}_R \bar{\nu} \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta d_{Rsa}) (\bar{u}_{Rr}^a \gamma^\eta C \bar{\nu}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_5} \quad (5.615)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta e_{Rs}) (\bar{u}_{Rr}^a \gamma^\eta u_{Rta}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_6} \quad (5.616)$$

$$\mathcal{O}_{C_L^2 e_L \bar{e}_L \bar{u}_R u_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta e_{Lp}) (\bar{u}_{Rr}^a \gamma^\eta u_{Rta}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_6} \quad (5.617)$$

$$\mathcal{O}_{C_L^2 d_L \bar{e}_L \bar{\nu} \bar{u}_R} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta d_{Lpa}) (\bar{u}_{Rr}^a \gamma^\eta C \bar{\nu}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_4}^{a_3} \quad (5.618)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L e_R \nu u_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta u_{Lpa}) (\nu_{Lr} C \gamma^\eta e_{Rt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.619)$$

$$\mathcal{O}_{C_L^2 \nu u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta \nu_{Lr}) (\bar{u}_{Ls}^a \gamma_\eta u_{Lpa}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_3} \quad (5.620)$$

$$\mathcal{O}_{C_L^2 \bar{e}_R e_R u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta e_{Rs}) (\bar{u}_{Lt}^a \gamma^\eta u_{Lra}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_4} \quad (5.621)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L e_L \bar{\nu} u_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Ls}^a \gamma_\eta e_{Lp}) (\bar{\nu}_{Lt} \gamma^\eta u_{Lra}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_5}^{a_4} \quad (5.622)$$

$$\mathcal{O}_{C_L^2 e_L \bar{e}_L u_L \bar{u}_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Ls} \gamma_\eta e_{Lp}) (\bar{u}_{Lt}^a \gamma^\eta u_{Lra}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_6}^{a_4} \quad (5.623)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R e_R \bar{\nu} u_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta e_{Rs}) (\bar{\nu}_{Lt} \gamma^\eta u_{Lra}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.624)$$

$$\mathcal{O}_{C_L^2 \bar{\nu}^2 \bar{u}_R u_L} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta u_{Lra}) (\bar{u}_{Rp}^a \gamma_\eta C \bar{\nu}_{Ls}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.625)$$

$$\mathcal{O}_{C_L^2 e_R \bar{e}_L \bar{u}_R u_L} \left| C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Rp}^a \gamma_\eta e_{Rs}) (\bar{e}_{Lt} \gamma^\eta u_{Lra}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_4} \quad (5.626)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{d}_L \nu \bar{u}_L} \left| \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Lt}^c \gamma^\eta \nu_{Lr}) (\bar{d}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^b) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_5 a_6} \quad (5.627)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{e}_R \bar{u}_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta C \bar{u}_{Ls}^b) (\bar{e}_{Rr} \gamma^\eta C \bar{u}_{Lt}^c) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_5 a_6} \quad (5.628)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{d}_L^2 e_L} \left| \mathcal{Y} \left[\begin{smallmatrix} r \\ s \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Lt}^c \gamma^\eta e_{Lr}) (\bar{d}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^b) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_5 a_6} \quad (5.629)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R^2 \bar{d}_L e_R} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rr}^b \gamma^\eta e_{Rt}) (\bar{d}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^c) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_4 a_5} \quad (5.630)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R^2 \bar{\nu} \bar{u}_L} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta C \bar{u}_{Ls}^c) (\bar{d}_{Rr}^b \gamma^\eta C \bar{\nu}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_4 a_5} \quad (5.631)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L^2 \nu \bar{u}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Lt}^c \gamma^\eta \nu_{Lr}) (\bar{u}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^b) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_5 a_6} \quad (5.632)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L \bar{e}_R \bar{u}_R \bar{u}_L} \left| \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \gamma_\eta C \bar{d}_{Ls}^b) (\bar{u}_{Rr}^a \gamma^\eta C \bar{u}_{Lt}^c) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_4 a_5 a_6} \quad (5.633)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{d}_L \bar{\nu} \bar{u}_R} \left| \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^c) (\bar{u}_{Rr}^b \gamma^\eta C \bar{\nu}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_4 a_5} \quad (5.634)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R \bar{e}_L \bar{u}_R \bar{u}_L} \left| \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta C \bar{e}_{Ls}) (\bar{u}_{Rr}^b \gamma^\eta C \bar{u}_{Lt}^c) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_4 a_6} \quad (5.635)$$

$$\mathcal{O}_{C_L^2 \bar{d}_L \bar{e}_L \bar{u}_R^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] \epsilon_{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Rp}^a \gamma_\eta C \bar{d}_{Ls}^c) (\bar{u}_{Rr}^b \gamma^\eta C \bar{e}_{Lt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon_{a_3 a_4 a_5} \quad (5.636)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R^2 d_R^2}^{(1,2)} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \gamma_\eta d_{Rsa}) (\bar{d}_{Rr}^b \gamma^\eta d_{Rtb}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[2],[2]} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_4}^{a_6} \quad (5.637)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_R d_L \bar{d}_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Lt}^b \gamma^\eta d_{Lrb}) (\bar{d}_{Rp}^a \gamma_\eta d_{Rsa})}{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{d}_{Lt}^c \gamma^\eta d_{Lra}) (\bar{d}_{Rp}^a \gamma_\eta d_{Rsc})} \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \quad (5.638)$$

$$\mathcal{O}_{C_L^2 \bar{d}_R d_L u_R \bar{u}_L}^{(1,2)} \left| \frac{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Lt}^b \gamma^\eta d_{Lrb}) (\bar{d}_{Rp}^a \gamma_\eta u_{Rsa})}{C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{u}_{Lt}^c \gamma^\eta d_{Lra}) (\bar{d}_{Rp}^a \gamma_\eta u_{Rsc})} \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \delta_{a_3}^{a_5} \delta_{a_6}^{a_4} \quad (5.639)$$

$$\mathcal{O}_{C_L^2 d_R^2 \nu_L} \left| \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (uL_{pa} C\gamma_\eta d_{Rsb}) (\nu_{Lr} C\gamma^\eta d_{Rtc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{a_3 a_5 a_6} \right| \quad (5.654)$$

$$\mathcal{O}_{C_L^2 d_R e_L u_R u_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (e_{Lp} C\gamma_\eta d_{Rsb}) (uL_{ra} C\gamma^\eta u_{Rtc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{a_4 a_5 a_6} \right| \quad (5.655)$$

$$\mathcal{O}_{C_L^2 d_R d_L \bar{\nu}_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (\bar{\nu}_{Lt} \gamma^\eta u_{Lrb}) (dL_{pa} C\gamma_\eta d_{Rsc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{a_3 a_4 a_5} \right| \quad (5.656)$$

$$\mathcal{O}_{C_L^2 d_L e_R u_R u_L} \left| \epsilon^{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (dL_{pa} C\gamma_\eta e_{Rs}) (uL_{rb} C\gamma^\eta u_{Rtc}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{a_3 a_4 a_6} \right| \quad (5.657)$$

$$\mathcal{O}_{C_L^2 d_R e_R u_L^2} \left| \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] \epsilon^{abc} C_{L\mu\nu\lambda\rho} C_L^{\mu\nu\lambda\rho} (uL_{pa} C\gamma_\eta d_{Rsc}) (uL_{rb} C\gamma^\eta e_{Rt}) \right| \mathcal{C}_{f_3, f_4, f_5, f_6}^{[1,1]} [56] \langle 12 \rangle^4 \langle 34 \rangle \epsilon^{a_3 a_4 a_5} \right| \quad (5.658)$$

Class $C_R^2 \psi^4$: 18 types

$$\mathcal{O}_{C_R^2 \nu^4} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \nu_{Lp} C \nu_{Lr} \nu_{Ls} C \nu_{Lt} \right| \mathcal{C}_{f_1 f_2 f_3 f_4}^{[2,2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \right| \quad (5.659)$$

$$\mathcal{O}_{C_R^2 \bar{e}_R e_L \nu^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix} \right] (\bar{e}_{Rp} e_{Lr}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \nu_{Ls} C \nu_{Lt} \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma_{\eta\xi} e_{Lr}) (\nu_{Ls} C \sigma^{\eta\xi} \nu_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \end{array} \right| \quad (5.660)$$

$$\mathcal{O}_{C_R^2 \bar{e}_R^2 e_L^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} e_{Ls} C e_{Lt} \bar{e}_{Rp} C \bar{e}_{Rr} \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix}, \begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{e}_{Rp} \sigma_{\eta\xi} C \bar{e}_{Rr}) (e_{Ls} C \sigma^{\eta\xi} e_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1 f_2, f_3 f_4}^{[2], [2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1], [1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \end{array} \right| \quad (5.661)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R^3 e_L} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ s \end{smallmatrix} \right] (\bar{d}_{Rs}^c e_{Lt}) \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{d}_{Rp}^a C \bar{d}_{Rr}^b \right| \mathcal{C}_{f_1 f_2 f_3, f_4}^{[2,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon_{a_1 a_2 a_3} \right| \quad (5.662)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R^2 \nu \bar{u}_R}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \end{smallmatrix} \right] \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} C \bar{d}_{Rr}^b) (\bar{u}_{Rs}^c \sigma^{\eta\xi} \nu_{Lt}) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ r \end{smallmatrix} \right] (\bar{u}_{Rs}^c \nu_{Lt}) \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{d}_{Rp}^a C \bar{d}_{Rr}^b \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1 f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon_{a_1 a_2 a_3} \\ \mathcal{C}_{f_1 f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon_{a_1 a_2 a_3} \end{array} \right| \quad (5.663)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R \bar{e}_R \bar{u}_R^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix} \right] \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} C \bar{e}_{Rr}) (\bar{u}_{Rs}^b \sigma^{\eta\xi} C \bar{u}_{Rt}^c) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] \epsilon_{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{d}_{Rp}^a C \bar{e}_{Rr} \bar{u}_{Rs}^b C \bar{u}_{Rt}^c \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon_{a_1 a_3 a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon_{a_1 a_3 a_4} \end{array} \right| \quad (5.664)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R d_L \nu^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \end{smallmatrix} \right] (\bar{d}_{Rp}^a d_{Lra}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \nu_{Ls} C \nu_{Lt} \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} d_{Lra}) (\nu_{Ls} C \sigma^{\eta\xi} \nu_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_2} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_2} \end{array} \right| \quad (5.665)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R d_L \bar{e}_R e_L}^{(1,2)} \left| \begin{array}{l} (\bar{d}_{Rp}^a d_{Lra}) (\bar{e}_{Rs} e_{Lt}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} d_{Lra}) (\bar{e}_{Rs} \sigma^{\eta\xi} e_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_2} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_2} \end{array} \right| \quad (5.666)$$

$$\mathcal{O}_{C_R^2 d_L \bar{e}_R \nu \bar{u}_R}^{(1,2)} \left| \begin{array}{l} (\bar{e}_{Rr} d_{Lpa}) (\bar{u}_{Rs}^a \nu_{Lt}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{e}_{Rr} \sigma_{\eta\xi} d_{Lpa}) (\bar{u}_{Rs}^a \sigma^{\eta\xi} \nu_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_3}^{a_1} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_3}^{a_1} \end{array} \right| \quad (5.667)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R e_L \nu u_L}^{(1,2)} \left| \begin{array}{l} (\bar{d}_{Rp}^a e_{Lr}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} u_{Lsa} C \nu_{Lt} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{Rp}^a \sigma_{\eta\xi} e_{Lr}) (u_{Lsa} C \sigma^{\eta\xi} \nu_{Lt}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \end{array} \right| \quad (5.668)$$

$$\mathcal{O}_{C_R^2 \nu^2 \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] \left(\bar{u}_{R_p}^a u_{L_{ra}} \right) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \nu_{L_s} C \nu_{L_t} \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \left(\bar{u}_{R_p}^a \sigma_{\eta\xi} u_{L_{ra}} \right) \left(\nu_{L_s} C \sigma^{\eta\xi} \nu_{L_t} \right) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_2} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_2} \end{array} \quad (5.669)$$

$$\mathcal{O}_{C_R^2 \bar{e}_R e_L \bar{u}_R u_L}^{(1,2)} \left| \begin{array}{l} (\bar{e}_{R_p} e_{L_r}) (\bar{u}_{R_s}^a u_{L_{ta}}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{e}_{R_p} \sigma_{\eta\xi} e_{L_r}) (\bar{u}_{R_s}^a \sigma^{\eta\xi} u_{L_{ta}}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_3}^{a_4} \end{array} \quad (5.670)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R^2 d_L^2}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} d_{L_{sa}} C d_{L_{tb}} \bar{d}_{R_p}^a C \bar{d}_{R_r}^b \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{R_p}^a \sigma_{\eta\xi} C \bar{d}_{R_r}^b) (d_{L_{sa}} C \sigma^{\eta\xi} d_{L_{tb}}) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} d_{L_{sa}} C d_{L_{tb}} \bar{d}_{R_p}^a C \bar{d}_{R_r}^b \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{R_p}^a \sigma_{\eta\xi} C \bar{d}_{R_r}^b) (d_{L_{sa}} C \sigma^{\eta\xi} d_{L_{tb}}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2],[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2],[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1],[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1],[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \end{array} \quad (5.671)$$

$$\mathcal{O}_{C_R^2 \bar{d}_R d_L \bar{u}_R u_L}^{(1\sim 4)} \left| \begin{array}{l} (\bar{d}_{R_p}^a d_{L_{ra}}) (\bar{u}_{R_s}^c u_{L_{tc}}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{R_p}^a \sigma_{\eta\xi} d_{L_{ra}}) (\bar{u}_{R_s}^c \sigma^{\eta\xi} u_{L_{tc}}) \\ (\bar{d}_{R_p}^a d_{L_{rb}}) (\bar{u}_{R_s}^b u_{L_{ta}}) C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \\ C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{d}_{R_p}^a \sigma_{\eta\xi} d_{L_{rb}}) (\bar{u}_{R_s}^b \sigma^{\eta\xi} u_{L_{ta}}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_2} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_2} \delta_{a_3}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_4} \delta_{a_3}^{a_2} \\ \mathcal{C}_{f_1, f_2, f_3, f_4} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_4} \delta_{a_3}^{a_2} \end{array} \quad (5.672)$$

$$\mathcal{O}_{C_R^2 \bar{u}_R^2 u_L^2}^{(1\sim 4)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{u}_{R_p}^a C \bar{u}_{R_r}^b u_{L_{sa}} C u_{L_{tb}} \\ \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s & t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{u}_{R_p}^a \sigma_{\eta\xi} C \bar{u}_{R_r}^b) (u_{L_{sa}} C \sigma^{\eta\xi} u_{L_{tb}}) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} \bar{u}_{R_p}^a C \bar{u}_{R_r}^b u_{L_{sa}} C u_{L_{tb}} \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix}, \begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (\bar{u}_{R_p}^a \sigma_{\eta\xi} C \bar{u}_{R_r}^b) (u_{L_{sa}} C \sigma^{\eta\xi} u_{L_{tb}}) \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2],[2]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2],[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1],[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1],[1,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \delta_{a_1}^{a_3} \delta_{a_2}^{a_4} \end{array} \quad (5.673)$$

$$\mathcal{O}_{C_R^2 d_L^3 \bar{e}_R} \left| \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline s \end{smallmatrix} \right] (\bar{e}_{R_t} d_{L_{sc}}) \epsilon^{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} d_{L_{pa}} C d_{L_{rb}} \right| \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2,1]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon^{a_1 a_2 a_3} \quad (5.674)$$

$$\mathcal{O}_{C_R^2 d_L^2 \nu u_L}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} p & r \\ \hline \end{smallmatrix} \right] \epsilon^{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (d_{L_{pa}} C \sigma_{\eta\xi} d_{L_{rb}}) (u_{L_{sc}} C \sigma^{\eta\xi} \nu_{L_t}) \\ \mathcal{Y} \left[\begin{smallmatrix} p \\ \hline r \end{smallmatrix} \right] \epsilon^{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} d_{L_{pa}} C d_{L_{rb}} u_{L_{sc}} C \nu_{L_t} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon^{a_1 a_2 a_3} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon^{a_1 a_2 a_3} \end{array} \quad (5.675)$$

$$\mathcal{O}_{C_R^2 d_L e_L u_L^2}^{(1,2)} \left| \begin{array}{l} \mathcal{Y} \left[\begin{smallmatrix} s & t \\ \hline \end{smallmatrix} \right] \epsilon^{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} (d_{L_{pa}} C \sigma_{\eta\xi} e_{L_r}) (u_{L_{sb}} C \sigma^{\eta\xi} u_{L_{tc}}) \\ \mathcal{Y} \left[\begin{smallmatrix} s \\ \hline t \end{smallmatrix} \right] \epsilon^{abc} C_{R\mu\nu\lambda\rho} C_R^{\mu\nu\lambda\rho} d_{L_{pa}} C e_{L_r} u_{L_{sb}} C u_{L_{tc}} \end{array} \right| \begin{array}{l} \mathcal{C}_{f_1, f_2, f_3, f_4}^{[2]} [56]^4 \langle 13 \rangle \langle 24 \rangle \epsilon^{a_1 a_3 a_4} \\ \mathcal{C}_{f_1, f_2, f_3, f_4}^{[1,1]} [56]^4 \langle 12 \rangle \langle 34 \rangle \epsilon^{a_1 a_3 a_4} \end{array} \quad (5.676)$$

6 Conclusion

In this study, we step-by-step build the amplitude-operator correspondence for spin-2 particles and fields. We first demonstrate that the Ricci tensor and Ricci scalar components of the Riemann Tensor can always be dropped by field redefinition in the basis construction. Thus the only component that should be retained in the Lagrangian is the Weyl tensor $C_{\mu\nu\rho\sigma}$. Second, we prove with Bianchi identity that both $D^2 C_{\mu\nu\rho\sigma}$ and $D^\mu C_{\mu\nu\rho\sigma}$ are functional of Ricci tensor and scalar, thus both of the term can be set to zero in finding operator basis at a given dimension, which corresponds to setting EOM of Weyl tensor to zero and put the graviton in the amplitude on-shell. Finally, we illustrate that in the spinor notation,

only the single particle module for the building block $D^n C_{L/R}$ with totally symmetrized spinor indices need to be retained. Because any anti-symmetrized spinor indices would yield $D^2 C_{\mu\nu\rho\sigma}$, $D^\mu C_{\mu\nu\rho\sigma}$ or $[D_\mu, D_\nu]$ and can be set to zero according to the proceeding argument. This is exactly the same as the amplitude-operator correspondence for the fields with helicity $|h| \leq 1$. Therefore, we can use the Young tensor method to construct the complete and independent operator basis for the gravity EFTs.

One difference compared with our previous work is that, when obtaining the operator m-basis, to avoid the time-consuming process for simplifying the chain of σ matrices, we directly construct over-complete Lorentz structures for an operator type by exhausting all the different contractions between Lorentz indices. By mapping candidates of these operators to the corresponding on-shell amplitudes, one can obtain the coordinates on the y-basis amplitudes, which helps us to select an independent set of monomial Lorentz structures as the m-basis.

Using this updated algorithm, we obtain the complete and independent on-shell Lorentz structures and amplitudes for the gravity EFTs involving (Goldstone) scalar, gauge boson in Yang-Mills theory, and spin-1/2 fermions. Finally, taking the gauge and flavor structures into account, the GRSMEFT and GRLEFT operator/amplitude basis are obtained up to mass dimension 10.

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Note added. During the preparation of this work, ref. [44] appeared, which implements our algorithm for enumeration of the SMEFT operators up to dimension-12 and GRSMEFT up to dimension-11. However, in their work, they express the operators in terms of the fields with purely spinor indices for the Lorentz group, and with purely fundamental indices for the gauge group, basically the y-basis in our notation. In contrast, in our work, we convert the y-basis operator into the form of m-basis, where the field strength tensor and Weyl tensors are written in terms of ordinary four-component Lorentz indices, and the corresponding gauge indices are expressed in a more commonly used notation. This conversion is a non-trivial task and is one of our new updates to our previous algorithm. In addition, we also provide the independent amplitudes for each operator type in the bracket notation.

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