

Index

- absorbing boundary layer, 63
- accuracy, 7, 9, 13, 19, 43, 53, 95, 124, 126, 135, 147, 154, 163, 180, 213, 216
- adiabatic, 24, 26
- anisotropic, 10, 182, 188
- artificial boundary, 6, 7, 33–35, 40, 53, 124, 153–155, 171, 209, 217
- basis function, 12–14, 217
- boundary condition, 2, 6, 7, 43, 153, 222
 - absorbing, 5, 7, 72
 - Dirichlet
 - imposing, 224
 - Dirichlet, 28, 30, 38, 146, 161
 - homogeneous, 68, 72
 - displacement, 146
 - DtN, 10, 35, 53, 126, 153, 155
 - essential, 84, 146, 222
 - local, 7
 - mixed, 223
 - natural, 45, 147, 223
 - Neumann, 28, 147
 - PML, 10
 - traction, 146, 147
 - transient, 2
- boundary element method, 4
- boundary value problem, 19, 65
 - model, 14
- Cauchy principal value, 5, 94
- collocation
 - derivative, 18
 - points, 17
- column approximate minimum degree re-ordering, 43, 224
- computational cost, 8, 9, 41, 207, 209
- computational domain, 2, 6, 13, 19, 33, 35, 37, 43, 45, 50, 54, 64, 69, 95, 155, 160, 161, 166, 175, 181, 185, 199, 221, 225
- conditioning, 9, 216
- connectivity matrix, 222, 224
- continuum, 134, 138, 141
 - mechanics, 134
 - medium, 139
- convergence, 9, 126
 - exponential, 216
 - rapid, 11

- rate of, 12
- speed of, 216
- CPU time, 123, 207–209
- Cuthill-McKee reordering, 43, 224
- damping
 - contribution, 100
 - function, 67, 188
 - layer, 185
 - matrix, 99, 100
 - profile, 188
 - region, 3
- dispersion
 - numerical, 72, 217
 - properties, 13
 - relation, 7
- Domain decomposition method, 12
- DtN
 - kernels, 36
 - map, 8, 33, 37, 39, 120, 161, 206
 - operator, 34, 39, 124, 154, 162
- dummy indices, 141
- eigenfunction, 14
- eigenvalue, 17, 18, 34
- elastics system, 188
- element level, 100
- entropy, 26
- equation
 - classical elasticity, 182
 - complex-symmetric matrix, 70
 - differential, 153
 - elastodynamic, 185
 - field, 156
 - Helmholtz, 2, 8, 9, 23, 27, 28, 34, 43, 64, 68, 98, 163
 - classic, 68
 - elastodynamic, 2
 - two-dimensional, 10, 95
 - variable-coefficient, 68
- of conservation of mass, 139
- of continuity, 23, 25, 26
- of elastodynamics, 134, 143
- of motion, 23, 26, 134, 143
- of Navier, 143
- PML, 186
- time-harmonic, 155
- wave, 9, 23, 27, 182
 - acoustic, 26
 - elastic, 134, 154, 182
 - linear, 23
 - new, 183
 - one-way, 7
 - reduced, 2, 7, 27, 35, 36
- exterior, 5, 182
 - acoustics, 9
 - boundary, 8, 33
 - domain, 2–4, 9, 98, 153, 215
 - Helmholtz, 35

- layer, 8, 63
- problem, 63, 96, 147, 155
- region, 95
- far field, 5, 97
- frame of reference, 138
- Fredholm integral equation, 3
- full
 - box, 40
 - matrix, 4, 12
- Galerkin, 12
 - approach, 100
 - approximation, 70
 - form, 37
 - formulation, 94, 153
 - Gradient Least-Squares, 153
 - method, 12
- Green function, 7
- grid
 - generation, 45
 - point, 12, 20, 71
 - structured, 221
 - value, 18
- Hankel function, 7, 149, 158
 - of the second kind, 30
- Helmholtz decomposition, 156
- homogeneous, 141, 183
 - continuum, 142
 - elastodynamic medium, 156
 - medium, 27
- Hookean solid, 134
- identity matrix, 68, 188
- implementation, 8, 9, 182, 216
 - finite element, 182
 - practical, 34
 - practical, 155
 - spectral element, 216
- infinite domain, 33, 36, 155
- inhomogeneous, 3, 186
 - medium, 10, 182, 188
- integration, 5, 43, 164, 223
 - Chebyshev–Gauss–Lobatto, 17
 - element, 101
 - in the exterior, 94
 - numerical, 5, 94
 - of polynomial, 5
 - order, 221
 - points, 221, 222
 - quadratures, 223
 - simple, 94
 - weights, 221
- inviscid, 23, 24
- isotropic, 141, 142, 156
 - continuum, 142
 - medium, 142, 183
- Jacobian, 19, 41, 185
- kernel, 3, 36, 39, 40, 160, 162

- rectangular, 159
- Kronecker's delta, 15
- L^2 norm, 43, 73, 101, 164, 189
- Lamé's
 - constant, 145
 - moduli, 142
 - modulus, 145
- law
 - balance, 138
 - Cauchy's first, 140
 - conservation, 134, 136
 - fundamental, 138
 - Hooke's, 141, 145
 - of motion, 140
- linear solver, 43, 224
- mapping, 41, 42, 95–97, 187
 - function, 19
 - functions basis, 41, 96
 - subparametric, 19
- material derivative, 25, 139
- MATLAB, 9, 32, 43, 124, 163, 216, 219, 224
 - search path, 220
- mesh generation, 221
- modulus
 - shear, 142, 144
 - Young's, 144, 147
- mortar element, 217
- multiplicity, 17, 18
- near-field, 95
- nodal
 - matrices, 188
 - submatrices, 187
- non-Hermitian, 68
- non-polar case, 141
- Non-Reflecting Boundary Condition,
 - see* NRBC
- nonnegative, 66
 - constants, 71
 - real function, 66, 67, 184
- nonoverlapping
 - elements, 38
 - subdomains, 13
- NRBC, 3, 5–7, 34, 154
 - global, 8
 - Higdon's, 7
 - high-order local, 217
- penalty method, 224
- polynomials
 - Chebyshev, 13, 14, 19, 70
 - Jacobi, 14
 - Legendre, 13, 14, 16, 19, 70
 - orthogonal, 14
- quadrangle, 13, 38, 161
 - curved, 19
- quadrature
 - Gauss, 4

- Gauss–Lobatto–Legendre, 19, 43, 164
- radiation condition, 53, 97
 - Sommerfeld, 2, 3, 29, 35, 98, 147, 155, 156, 216
- recurrence
 - formula, 158
 - relation, 15, 16
- reference
 - segment, 41
 - solution, 118
- rigid body motion, 136
- series, 31, 154, 162
 - Fourier, 157
 - infinite, 39, 154
 - Taylor, 26
 - truncated, 61
- shaped
 - bean–, 44
 - piriform–, 102
- small perturbations, 135
- Sobolev space, 19, 37, 160
 - weighted, 95, 98
- stability, 124
- stress–strain relation, 134, 144, 145
- stretched coordinate, 8, 10, 66, 182, 183
- Sturm–Liouville problem, 14
- tensor
 - alternating, 140
 - Cauchy stress, 138
 - elastic, 142
 - elasticity, 141, 142
 - fourth-order, 141, 142, 186, 187
 - index pair, 187
 - isotropic, 142
 - metric, 67
 - product, 18, 222
 - rotation, 136
 - second-rank, 138
 - strain, 133–135, 141, 186
 - infinitesimal, 136
 - stress, 2, 133, 138, 141
 - symmetric, 142
- theorem
 - divergence, 26
 - Gauss’s, 139, 140
 - Gauss’s divergence, 25
 - Green’s, 4
 - Helmholtz’s, 143, 156
 - transport, 139
- transfinite interpolation, 45, 74, 190
 - multivariate, 221
- transient signal, 2
- variational
 - form, 19
 - formulation, 37, 69, 98
 - conjugated Astley–Leis, 98
- velocity, 28, 30, 182

-
- amplitude, 44, 73, 102
 - field, 45, 75
 - harmonic radiation, 44, 73, 102
 - of dilatational waves, 144
 - of distortional waves, 144, 188
 - particle, 24, 27
 - potential, 27
 - surface, 30
 - Voigt notation, 187
 - wave
 - acoustic, 2, 9, 27
 - components, 94
 - decomposition, 95
 - diffracted, 181
 - elastic, 133, 134, 149, 182
 - electromagnetic, 63
 - evanescent, 67
 - frequency, 27
 - mechanical, 2
 - one-way, 7
 - outgoing, 2, 147
 - plane, 66, 183
 - progressive, 97
 - propagation, 1, 9–11, 13, 183
 - reflected, 71
 - scalar, 146
 - sea-, 1
 - seismic, 1, 181
 - sound, 23
 - speed, 72
 - steady-state, 2
 - transient, 2, 217
 - vector, 66, 183
 - wavelength, 45, 71, 75, 84, 102, 165
 - weak form, 10, 19, 34, 36, 37, 64, 69, 94, 95, 98, 155, 160, 161, 182, 184–186
 - weighted residuals, 12