Index

adaptive smoothing, 291
additional internal variables, 18, 41. See also
anelastic functions
anelastic
  coefficient, 43, 45, 164, 210, 213, 277
  function, 20, 41, 45, 75, 164, 277. See also
  memory variables
approximation
  adjusted, 158, 218, 228
  backward, 87, 170
  centred, 87, 147, 170, 175, 252
  forward, 86, 170
  Lax–Friedrichs, 93
  one-sided, 88, 170, 175, 252
asperity, 62
AUTH, 309
Axitra, 210, 214, 220, 313
backbone curve, 46, 53, 56
body-force term, 17, 161, 243
Boltzmann’s principle, 25
boundary
  Dirichlet, 9, 226, 297
  embedded, 224
  Neumann, 9
  nonreflecting, 233
buoyancy, 99
CEA, 226, 309
characteristic (critical) distance, 62
coarse graining, 20
coarse spatial distribution, 20, 214
compliance, 27
condition
  boundary, 10, 83, 84, 152, 167, 168, 199, 225, 255,
  263
  Courant–Friedrichs–Lewy, 141
initial, 148, 248, 281
stability, 109, 184, 195, 281, 288
traction-free, 16, 156, 217, 226
conditionally stable, 94, 281
consistency, 83, 94, 97
constitutive law
  stress–strain relation, 8, 12, 164, 208, 212, 277,
  293
  on fault, 60
  constitutive parameters, 64
continuum
  elastic, 11
  elastoplastic, 12
  viscoelastic, 40, 164, 212
convergence, 83, 95, 110
convolution, 23, 65
Courant number, 110, 139
  crack tip, 58, 61
damping, 57, 237
dashpot, 22
dip, 69
dispersion relation, 100
dispersion–dissipation relation, 102
dissipation, 100
double-couple, 17
E2VP, 44
e-invariants, 263, 282
equivalent medium, 201
error
  local, 83
  truncation, 87
EUROSEIS-TEST, 309
filter, Lanczos, 232
filtration, a posteriori, 289
force couple, 65, 243
frequency
  normalized, 113
  characteristic (relaxation), 38, 44,
  213
friction
  coefficient, 60
  Coulomb, 288
kinematic (dynamic), 62
friction

law
rate-and-state, 62
slip-weakening, 62
static, 22, 62

function
creep, 13, 27
relaxation, 13
shape, 265

grid
cell, 85
collocated, 86
conventional, 85
coordinates, 84
curvilinear, 225
dispersion, 83, 95
partly-staggered, 86
point, 84
rotated staggered, 169, 175
space–time, 84
spatially staggered, 86
staggered, 86
harmonic averaging, 124, 152
hereditary integral, 24
homogenization, 202
Hooke’s law, 12
hysteresis loop, 46

ILL, 309
integration
Gaussian, 276, 287
Lobatto, 287
ISTerre, 309
Jacobian, 273
Lamé elastic coefficients, 97
Lax equivalence theorem, 95
long-wave equivalent, 201
low-pass filtering, 293

matrix
global mass, 278, 280
global stiffness, 263
local mass, 274
memory variables, 19, 41. See also anelastic functions
method
Aki–Larner, 73
boundary integral equation, 73, 246
boundary-element, 73
Bubnov–Galerkin, 266
complex-step, 93
discrete-wavenumber, 73
mortar, 228
von Neumann, 95

mode
hourglass, 276, 293
mode II (in-plane), 251
mode III (anti-plane), 251
modulus
bulk, 45
effective grid, 151
elastic, 20
relaxed, 26
secant shear, 56
shear, 45
tangential shear, 56
unrelaxed, 19, 26
viscoelastic, 18, 25
modulus defect, 26
moment
moment-density tensor, 65
scalar seismic, 66
tensor, 65
Mygdonian basin, 44

node
partial, 247
split, 247
nucleation, 17, 58
Nyquist frequency, 111
wavenumber, 75
odd–even decoupling, 148
overstress, 257
Parkfield area, 308
phase, 100
quality factor, 18, 34
rake, 69
ratio
Poisson’s, 166, 325
P-wave to S-wave speed, 166, 175, 223, 325
stability, 109, 184
representation theorem, 65
reversal point, 46, 50
rupture propagation, 17, 58
SCEC, 308
scheme
dissipative, 103
Lax–Wendroff, 144
leapfrog, 93
MacCormack, 145
nonattenuative, 105
nondissipative, 103
optimally accurate, 94
predictor-corrector, 132
Runge–Kutta, 86
spatial sampling, 95, 104, 184, 251, 290
Index

<table>
<thead>
<tr>
<th>Term</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>stability factor, 110</td>
<td></td>
</tr>
<tr>
<td>strain</td>
<td></td>
</tr>
<tr>
<td>activating, 54</td>
<td></td>
</tr>
<tr>
<td>tensor, 8</td>
<td></td>
</tr>
<tr>
<td>stress</td>
<td></td>
</tr>
<tr>
<td>activating, 50</td>
<td></td>
</tr>
<tr>
<td>asperity, 256</td>
<td></td>
</tr>
<tr>
<td>imaging, 218</td>
<td></td>
</tr>
<tr>
<td>incremental, 161</td>
<td></td>
</tr>
<tr>
<td>tensor, 8</td>
<td></td>
</tr>
<tr>
<td>yield, 22</td>
<td></td>
</tr>
<tr>
<td>stretching factor, 159, 236</td>
<td></td>
</tr>
<tr>
<td>strike, 69</td>
<td></td>
</tr>
<tr>
<td>summation-by-parts, 167, 246</td>
<td></td>
</tr>
<tr>
<td>tensor</td>
<td></td>
</tr>
<tr>
<td>Green, 65</td>
<td></td>
</tr>
<tr>
<td>of elastic moduli, 65</td>
<td></td>
</tr>
<tr>
<td>Thessaloniki, 44</td>
<td></td>
</tr>
<tr>
<td>time</td>
<td></td>
</tr>
<tr>
<td>sampling, 105</td>
<td></td>
</tr>
<tr>
<td>step, 84</td>
<td></td>
</tr>
<tr>
<td>traction</td>
<td></td>
</tr>
<tr>
<td>constraint, 247</td>
<td></td>
</tr>
<tr>
<td>frictional, 60</td>
<td></td>
</tr>
<tr>
<td>initial, 17, 60</td>
<td></td>
</tr>
<tr>
<td>normal, 62, 63</td>
<td></td>
</tr>
<tr>
<td>shear, 60</td>
<td></td>
</tr>
<tr>
<td>total, 60</td>
<td></td>
</tr>
<tr>
<td>trial, 249</td>
<td></td>
</tr>
<tr>
<td>transversely isotropic, 201</td>
<td></td>
</tr>
<tr>
<td>Turkey Flat, 308</td>
<td></td>
</tr>
<tr>
<td>unconditionally stable, 94</td>
<td></td>
</tr>
<tr>
<td>unstable, 94</td>
<td></td>
</tr>
<tr>
<td>vacuum formalism, 156, 217</td>
<td></td>
</tr>
<tr>
<td>validation, 308</td>
<td></td>
</tr>
<tr>
<td>vector</td>
<td></td>
</tr>
<tr>
<td>displacement, 8</td>
<td></td>
</tr>
<tr>
<td>global boundary-condition, 279</td>
<td></td>
</tr>
<tr>
<td>global discrete-displacement, 279</td>
<td></td>
</tr>
<tr>
<td>global load-force, 278</td>
<td></td>
</tr>
<tr>
<td>global restoring-force, 263</td>
<td></td>
</tr>
<tr>
<td>local boundary-condition, 274</td>
<td></td>
</tr>
<tr>
<td>local discrete-displacement, 274</td>
<td></td>
</tr>
<tr>
<td>local load-force, 273</td>
<td></td>
</tr>
<tr>
<td>local restoring-force, 274</td>
<td></td>
</tr>
<tr>
<td>traction, 9, 16</td>
<td></td>
</tr>
<tr>
<td>velocity</td>
<td></td>
</tr>
<tr>
<td>grid phase, 101</td>
<td></td>
</tr>
<tr>
<td>verification, 308</td>
<td></td>
</tr>
<tr>
<td>wave</td>
<td></td>
</tr>
<tr>
<td>grid, 99</td>
<td></td>
</tr>
<tr>
<td>P-SV, 223</td>
<td></td>
</tr>
<tr>
<td>SH, 223</td>
<td></td>
</tr>
</tbody>
</table>