Index

advective transport, 393
analytic element, 29, 283, 301, 333
anisotropy, 9
apparent path line, 396
apparent velocity, 396
aquicludes, 94
aquifers, 94
area-sink, 333
backward finite difference, 411
Bessel functions, 152
Bessel’s equation, 152
boundary value problem, 232
Boussinesq equation, 197
Cauchy integral, 235, 426
central finite difference, 411
classic, 396, 397
coastal aquifers, 104, 111
coefficient of volume compressibility, 196
complex variables, 218
contamination transport, 370
continuity equation, 12
countouring (of stream function), 357
creek, 323
critical time step, 408, 409
curl, 14
Darcy’s law, 8, 11
decay, 394
density, 8
Dirichlet problem, 233, 405
discharge, 5
discharge potential, 46, 107
for confined flow, 58
for horizontal confined flow, 21
for shallow confined interface flow, 111
for shallow unconfined interface flow, 117
for unconfined flow, 58
for vertically varying hydraulic conductivit, 96
discharge streamline, 22, 379
discharge vector, 20, 45
discharge well, 35
discontinuous discharge, 320
dispersion, 394
distribution factor, 398
ditch, 80
ditch function, 80
divergence, 12
dividing streamlines, 33
draw-down, 203
Dupuit formula, 50
dynamic viscosity, 6
elevation head, 4
elliptical boundary, 78
elliptical pond, 309
equipotentials, 21
Euler’s method, 362
modified, 360
exponential integral, 199
far-fields, 249
finite difference method, 403
finite element method, 403, 411
flow net, 23
flux-leakage factor, 143
forward finite difference, 411
free boundary, 128
free surface, 128
functional, 412
Gauss- Seidel iteration, 405, 411, 416
generating analytic element approach, 345
Girinskii potentials, 101
Index

435

radius of influence, 202
recharge, 69
recharge well, 35
reference level, 3
retardation factor, 396
Reynolds number, 7
 saturated thickness, 46
saturated zone, 44
seepage velocity, 2
seminfinite aquifer, 134
seminfinite layer, 134
shallow leaky aquifer, 134
shallow unconfined flow, 44
solute transport, 392
sorption, 392, 395
space-leakage factor, 143
specific discharge, 1
specific storage, coefficient of, 198
stagnation point, 31, 40, 54
storage, 195
storage equation, 195
storativity, 203
strata, 97
stratified aquifer (contaminant transport in), 399
stream function, 23, 227, 320
streamline, 357, 361
for transient flow, 359
in 3D, 380
stress-strain relation, 196
superposition, 74
superposition principle, 29
Thies solution, 199
Thiem equation, 26
time, 3
tip of saltwater wedge, 112, 117
total derivative, 397
tracing streamlines, 358
transient flow, 407, 419
transmissivity, 46, 203
two-dimensional flow in the vertical plane, 121
unconfined aquifer, 43
unsaturated zone, 370
variable transmissivity, 419
variational principle, 411, 412
vertical plane, 121
vertical stream surface, 379
vertically integrated flow, 65
volume strain, 195
well, 25
well function, 199
Wirtinger calculus, 218

harmonic function, 232
holomorphic matching, 349
Horner’s rule, 201
hybrid iterative approach, 304
hydraulic conductivity, 5, 6
tensor, 11
vertical variations of, 94
hydraulic gradient, 6, 8
hydraulic head, 3
hydodynamic dispersion, 394
image well, 37
implicit finite difference, 410
infiltration, 69, 80, 119, 404, 418
instability, 113
interface flow, 104
interzonal boundaries, 58
intrinsic permeability, 6
iteration index, 405
iterative solution, 284
jump in stream function, 321, 331
Laplace transform, 199
Laplace’s equation, 16, 21, 123, 152
leaky layers, 94, 134
line-dipole, 328
line-sink, 315
macroscopic dispersion, 395
mass balance equation, 12
maximum modulus theorem, 232
mean value theorem, 232
method of images, 29, 35
microscopic dispersion, 395
mixed boundary value problem, 233
modified Helmholtz equation, 136
Neumann problem, 233, 406
neutral lake, 257
Newton-Raphson procedure (for streamlines), 358
partial penetration, 40
path lines, 357, 361, 363
pattern of, 359
phreatic storage, coefficient of, 197
planar flow, 48, 371
plume, 377
Poisson equation, 70, 99
pond, 84
pond function, 84
porosity, 2
potential (for variable k), 421
potential \( \Phi \), 21
pressure, 3
pressure head, 4
pumping test, 203