

Index

- Accelerating flow 107
- Acoustic streaming
 - see* steady streaming
- Algebraic turbulence models 230
- Averaging
 - conditional 225
 - ensemble 229
 - method of 191
 - phase 224
 - time 224

- Backward differencing 100
- Blunt bodies
 - oscillations with no mean 158
 - separation 281
 - started impulsively 102
- Boundary-layer equations
 - basic concepts 13, 16
 - existence of solution 25
 - uniqueness of solution 25
- Bounds on boundary-layer solutions 20
- Box method 53
- Breakaway 280

- Catastrophic separation 280
- Characteristics
 - definition 6
 - direction 7
 - equation 7
 - surface 7
- Circular cylinder
 - impulsive motion 128
 - oscillations with no mean 172
- Classification of differential equations 9
- Compatibility 42
- Consistency 42

- Convergence 33
- Coordinate expansions
 - impulsive flow 105, 107, 110
- Courant Friedrichs-Lewy Criterion 43
- Crank-Nicolson scheme 42, 50
- Curved pipe flow 182

- Detachment 280
- Dimensionless parameters 88
- Discretization factor 32, 36
- Displacement thickness near separation 294

- Eddy viscosity 232
- Elliptic equations 9
- Ensemble average 229
- Equivalence Theorem 403
- Equivorticity lines 132

- Flat plate
 - impulsive motion 82
 - oscillatory flow 165
- Flow reversal
 - onset of 106
 - physical meaning 58, 106
- Form factor 294

- Görtler transformation 108
- Grids 31

- Heat equation 10
- Higher moments in turbulence 277
- Hyperbolic equations 10

- Implicit schemes 41, 49
- Impulsive flow change 80
- Impulsive flow solution
 - coordinate expansion 105, 107, 110
 - dimensionless parameters 88
 - exact solutions 89, 91
 - Navier–Stokes 118
 - numerical methods 95
 - order of magnitude analysis 86
 - self-similar characteristics 99
 - seminumerical methods 116
- Impulsive flow starts 80
- Impulsive motion
 - airfoil at angle of attack 132
 - blunt bodies 102
 - circular cylinder 128
 - circular pipe 91
 - ellipse at angle of attack 130
 - flat plate perpendicular to flow 130
 - infinite flat plate 82
 - pointed bodies 102
 - right-angle wedge 90
 - right cylinder 89
 - semiinfinite flat plate 90
- Impulsive pressure 81
- In-phase velocity component 250
- Integral equations 294
- Intermittency factor 233

- Joukowski transformation 70

- Keller's box method 53
- Kovalevski's theorem 8

- Laasonen scheme 49
- Lagrangian coordinates 181
- Laplace's equation 9
- Lattice configuration 31

- Mass transport in water waves 180
- Mehrstellen scheme 50
- Midpoint scheme 53
- Mixed implicit differencing 96
- Momentum thickness near separation 294
- Moving walls near separation 282, 286
- MRS
 - criterion 282
 - profiles 281

- No-slip condition 75

- One- and two-equation models 236
- Optimal coordinates 75
- Order of magnitude analysis 86
- Organized oscillations 224
- Oscillations (no mean flow)
 - blunt bodies 158
 - circular cylinder 172
 - curved pipe 182
 - infinite plate 165
 - Stokes layer 157
- Oscillations (nonvanishing mean)
 - nonlinear effects 209
 - separation 285
 - temperature field 194, 214
 - velocity field 187
- Out-of-phase velocity component 250
- Overshoots of velocity profiles 26

- Parabolic equations 10
- Parabolic variables 10
- Parameter expansion
 - impulsive flow 110
 - oscillatory laminar 187
 - oscillatory turbulent 228
- Partially reversed flow 58
- Phase averaging 224
- Pointed bodies started impulsively 92

- Quasi-steady turbulence models 231

- Random fluctuations 229
- Rayleigh flow 82, 89, 104
- Recirculating bubbles 131
- Reynolds stress
 - definition 226
 - mean 235
 - oscillating 235, 254
- Round-off errors 33, 38

- Schwarz-Christoffel transformation 73
- Self-similar solutions 289
- Seminumerical methods 116
- Semisimilar solutions 288, 306
- Separating flows
 - impulsive Howarth flow 314
 - Lagrangian formulation 317
 - slowly varying 296
- Separation
 - criteria 281
 - definition 280
 - emergence 320
 - moving walls 282, 286
 - oscillatory flow 285
 - self-similar solutions 289
- Similarity variables 99
- Stability 33
- Steady streaming
 - about a circular cylinder 159, 212
 - definition 159, 212
 - in water waves 179
- Streaming layer thickness 165
- Streaming temperature field 209, 210
- Stretched coordinates 13
- Stokes' first problem 89
- Stokes layer thickness 157
- Strouhal number 88
- Subcharacteristics
 - boundary-layer equations 20
 - definition 10
 - Navier–Stokes equations 17
- Temperature field
 - oscillatory flow 194
 - steady streaming 209, 210
- Thickness of boundary layer
 - mean flow 197
 - oscillatory flow 197
 - Stokes layer 159, 197
 - streaming layer 165
- Time averaging 224
- Timelike variables 10
- Traveling waves 215
- Tridiagonal matrix 52, 55
- Triple decomposition 224
- Truncation error 32, 42
- Turbulence closure schemes 227
- Turbulence models
 - algebraic 230
 - eddy viscosity 232
 - intermittency factor 233
 - one- and two-equations 236
 - quasi-steady 231
 - unsteady 235
- Unsteady turbulence models 235
- Upwind differencing 56
- Vanishing skin friction 292
- Von Neumann criterion 40
- Vortex sheets 82
- Water waves
 - mass transport, in 179
 - over flat bottoms 180
 - over wavy bottoms 178
 - steady streaming 179
- Wavy walls 178
- Zero skin friction 58, 106
- Zig-zag scheme 60
- Zones of influence and dependence 21