
Index

A

Accuracy 54, 72, 103, 229
Adjacent 148, 161
Alloy 46, 183
Aluminium 5, 129, 140
Anisotropic 2, 21, 27, 104
Assess 192, 196, 202
Assessment 141, 207, 232
Assumption 2, 13, 39, 82, 110

B

Background 1, 102
Benchmark 174
Bending 171, 174, 182, 237
Biaxial 181, 182
Bonding 82, 84, 87, 186
Boundary condition 36
Bridging matrix 54, 57, 77, 83
Bridging model 54, 84, 196, 225, 237
Bridging parameter 65, 73, 249
Buckling 104

C

Calibration 117
Carbon 6, 171
Ceramic 1
Classes 59, 171
Classical 103, 148,
Closed-form 100, 229
Complement 53
Complexity 101
Compliance matrix 4, 6, 7, 36, 57
Composition 53
Compressive failure 103, 158, 163,

165, 240,

Compressive strength 103, 228, 246
Computer routine 202, 237, 248
Concept 2, 8, 60
Confident 99
Configuration 82, 97
Constitute 11
Constitutive 11, 35, 48, 83, 226
Continuity 163
Correlation 50, 190, 207, 228
Coupling 84, 89, 106
Crack 100, 119, 158
Critical strain 165
Critical strength 99, 104
Critical stress 173, 211
CABM 237, 244
Curing 194, 202
Curvature 150, 152, 167, 237
Cycles 189
Cylindrical 223

D

Damage 35, 88
Defects 87, 119
Definition 9, 58, 89, 147, 227
Deflection 237
Degradation 159, 240
Derivative 45, 46
Detect 103, 120, 140, 170, 228
Deviation 66, 119, 171, 168, 208
Distribution 9, 19, 27

E

Elastic constants 4, 7, 13, 58, 85

Elastic deformation 35, 50, 53, 82
 Elasticity 2, 3
 Elastic moduli 19, 60, 71, 243
 Elastic modulus 44
 Elastic-plastic 41, 82, 86, 237
 Elasto-plastic 35, 43
 Engineering moduli 4, 68
 Epoxy matrix 81
 Epoxy polymer 41
 Equilibrium 3, 145, 169, 240
 Equivalent 9, 25, 102, 134, 156
 Eshelby's approach 19, 22
 Eshelby's problem 19, 60
 Eshelby's tensor 21, 23, 61, 63
 Euler trapezoidal method 48
 Evolution 35, 48, 88

F

Fabric 54, 141, 229
 Fabrication 4, 87, 119
 Failure envelope 126, 181, 197
 Failure mode 115, 162, 227
 FEM 53
 Fiber failure 115, 158
 Fiber materials 145, 202, 207
 Fiber properties 114, 171, 246
 Fiber strength 108, 121
 Fiber stresses 216
 Fiber reinforced composite 1, 9, 12, 177, 229
 Films 87
 Flexibility 145
 Fortran 237-239
 Fourier integral expressions 21
 Fracture 100, 174
 Frequency 131

G

Gaussian elimination scheme 240
 Generalized self-consistent scheme 19, 27
 Generalized maximum normal stress 103, 120, 139, 182, 244
 Generation 19
 Geometrical 13, 19, 82, 147, 158
 Global coordinate system 27, 28, 146,

147, 154
 Grade 196, 201

H

Hardening 39, 44, 82, 119
 Heat treatment 128
 High temperature 183
 Hybrid 162
 Hydrostatic 39, 102, 211
 Hypotheses 149

I

Implementation 237
 In situ 88, 119, 126, 171
 Inclusion 19, 25, 60, 61
 Independent 3, 4, 58, 60
 Industry 172
 Inelastic 35, 45, 50, 82, 173
 Inequality 121, 122, 134
 Infinite 19, 26, 60
 Infinitely 25, 60, 64
 Infinitesimal 3, 9
 Inhomogeneity 26, 27
 In-plane 66, 104, 244, 245
 Integrate 47
 Integration 48, 237
 Interaction 101, 196
 Interface 13, 59, 82, 158, 226
 Inter-layer 161, 162, 163, 164, 245
 Internal stresses 10, 13, 54, 92, 289
 Interval 109
 Isotropic 2, 4, 32, 51, 100, 162

K

Kirchhoff 149

L

Life prediction 131, 188
 Limitation 1, 164, 166, 240
 Linear algebraic equations 226, 239
 Linear elasticity 2, 3, 88
 Linearity 177
 Linear interpolation 133, 185, 188
 Linear segment 38, 238, 247, 248
 Load carrying capacity 58, 99, 145, 228

Loading condition 41, 129
 Local coordinate system 27, 150, 153,
 154, 226
 Lower bound 227

M

Matrix failure 108, 115, 228
 Matrix material 4, 35, 41, 155, 159
 Matrix properties 129, 163, 171, 226,
 247
 Matrix strength 119, 121, 126
 Measurement 119, 171
 Mechanical behavior 2, 162, 183, 226
 Mechanical performance 2, 92, 183
 Mechanical properties 1, 13, 51, 92,
 159
 Mechanical testing 227
 Microscopic 53
 Micromechanics 12, 19, 54, 96
 Monolithic 1, 88, 171, 227
 Mori-Tanaka 19, 27, 60, 81
 Multidirectional laminate 2, 119, 145,
 161, 237

N

Newton 49, 244
 Nonlinear behavior 173, 175
 Nonlinear characteristics 173
 Nonlinearity 178
 Nonlinear equation 239
 Normal stress 5, 35, 100, 103, 244
 Numerical 36, 48, 159, 165

O

Observation 36
 Octahedral shear stress 37, 40, 43, 86,
 89
 Off-axial 119, 120
 Optimal design 58, 100, 128, 229
 Orientation 53, 145
 Orthogonal 7, 181
 Orthotropic 4, 7
 Out-of-plane 56, 149, 169, 245

P

Particles 1

Physically 13, 170
 Planar 31, 43, 64, 89, 166
 Plastic 35, 82, 84
 Plasticity 35, 45
 Polymer matrix 92, 183, 202
 Polymers 2, 35, 41
 Powders 1
 Prandtl-Reuss 35, 37, 45, 86, 88
 Pressure 196
 Principal stress 42, 100, 157
 Proportional load 213, 226

Q

Quasi-isotropic 224

R

Reality 64
 Recover 120
 Recovery 120, 122, 129, 134, 185
 Reduction 103, 161
 Reinforcement 1, 2, 113
 Room temperature 92, 109, 117, 183
 RVE 8, 13, 16, 54, 230

S

Safety 99, 161
 Sample 114, 211
 Scatter 133, 188
 Separation 87
 Shear failure 108
 Shear modulus 5, 56, 66, 72, 110
 Shear moduli 7, 15, 66, 113
 Shear strength 115, 119, 173
 Software 228
 Standard 85, 238
 Stiffness discount scheme 100, 159,
 177, 229
 Stiffness matrix 8, 57, 229, 237, 240
 Strain energy 4, 29, 102
 Stress field 26, 39, 102
 Stress-strain relationship 37, 80, 88
 Stress-strain curve 38, 48, 159, 247
 Sub-interval 94, 109
 Symmetric 3, 5, 58, 147
 Symmetry 81

T

Task 58
Tangent 39, 247
Tangential 173, 225
Tensile failure 103, 158, 159, 163
Tensile strength 101, 102, 105, 227, 246
Thermal expansion coefficient 47, 92, 155, 246
Thermal residual stresses 94, 109, 183, 239, 293
Thermal load 129, 154, 171, 239
Three-dimensional 54, 101, 139, 163, 166
Threshold 100, 113
Titanium 45, 183
Transformation 19, 27, 150, 153, 238
Transversely isotropic 4, 5, 55, 82
Transverse moduli 113
Transverse modulus 16, 65, 72, 80
Triaxial 202, 210
Tsai-Wu criteria 104
Two-dimensional 104, 119, 113

U

UD composite 5, 145, 227
UD lamina 5, 99, 145, 174, 237
UD laminae 195, 203
Ultimate failure 125, 158, 163, 240
Ultimate strength 97, 100, 158, 163, 227

Uniaxial load 13, 68, 82, 100, 102
Unidirectional composites 80, 99, 120, 226
Unidirectional lamina 149, 154, 171
Unidirectional laminae 2, 54
Unidirectional laminate 174, 175

V

Variable 59, 88, 110, 169, 244
Variation 4, 53, 85, 226, 239
Vector 3, 11, 118, 240
Voids 9, 13, 118
Volume fraction 2, 11, 83, 162, 245
Von Mises effective stress 43
Von Mises equivalent stress 89, 108
Von Mises-Hencky theory 102

W

Working condition 183
Woven 1, 54, 229
WWFE 159, 160, 164
WWFE-I 192, 193, 285
WWFE-II 202, 206

Y

Yield Failure 100, 102
Yield strength 40, 100, 247
Young's modulus 4
Young's moduli 7, 247