

# Modules in Mechanics of Materials

## List of Symbols

$A$	area, free energy, Madelung constant
$\mathbf{A}$	transformation matrix
$\mathcal{A}$	plate extensional stiffness
$a$	length, transformation matrix, crack length
$a_T$	time-temperature shifting factor
$B$	design allowable for strength
$\mathbf{B}$	matrix of derivatives of interpolation functions
$\mathcal{B}$	plate coupling stiffness
$b$	width, thickness
$C$	stress optical coefficient, compliance
$\mathcal{C}$	viscoelastic compliance operator
$c$	numerical constant, length, speed of light
C.V.	coefficient of variation
$\mathbf{D}$	stiffness matrix, flexural rigidity of plate
$\mathcal{D}$	plate bending stiffness
$d$	diameter, distance, grain size
$E$	modulus of elasticity, electric field
$E^*$	activation energy
$\mathcal{E}$	viscoelastic stiffness operator
$e$	electronic charge
$e_{ij}$	deviatoric strain
$F$	force
$f_s$	form factor for shear
$G$	shear modulus
$\mathcal{G}$	viscoelastic shear stiffness operator
$\mathcal{G}_c$	critical strain energy release rate
$g$	acceleration of gravity
GF	gage factor for strain gages
$H$	Brinell hardness
$h$	depth of beam
$I$	moment of inertia, stress invariant
$\mathbf{I}$	identity matrix
$J$	polar moment of inertia
$K$	bulk modulus, global stiffness matrix, stress intensity factor
$\mathcal{K}$	viscoelastic bulk stiffness operator
$k$	spring stiffness, element stiffness, shear yield stress, Boltzman's constant
$L$	length, beam span
$\mathbf{L}$	matrix of differential operators

$M$	bending moment
$N$	crosslink or segment density, moire fringe number, interpolation function, cycles to failure
$\mathbf{N}$	traction per unit width on plate
$N_A$	Avogadro's number
$\mathcal{N}$	viscoelastic Poisson operator
$n$	refractive index, number of fatigue cycles
$\hat{\mathbf{n}}$	unit normal vector
$P$	concentrated force
$P_f$	fracture load, probability of failure
$P_s$	probability of survival
$p$	pressure, moire gridline spacing
$Q$	force resultant, first moment of area
$q$	distributed load
$R$	radius, reaction force, strain or stress rate, gas constant, electrical resistance
$\mathbf{R}$	Reuter's matrix
$r$	radius, area reduction ratio
$S$	entropy, moire fringe spacing, total surface energy, alternating stress
$\mathbf{S}$	compliance matrix
$s$	Laplace variable, standard deviation
SCF	stress concentration factor
$T$	temperature, tensile force, stress vector, torque
$T_g$	glass transition temperature
$t$	time, thickness
$t_f$	time to failure
$U$	strain energy
$U^*$	strain energy per unit volume
UTS	ultimate tensile stress
$\tilde{u}$	approximate displacement function
$V$	shearing force, volume, voltage
$V^*$	activation volume
$v$	velocity
$W$	weight, work
$u, v, w$	components of displacement
$x, y, z$	rectangular coordinates
$X$	standard normal variable
$\alpha, \beta$	curvilinear coordinates
$\alpha_L$	coefficient of linear thermal expansion
$\gamma$	shear strain, surface energy per unit area, weight density
$\delta$	deflection
$\delta_{ij}$	Kronecker delta
$\epsilon$	normal strain
$\boldsymbol{\epsilon}$	strain pseudovector
$\epsilon_{ij}$	strain tensor
$\epsilon_T$	thermal strain
$\eta$	viscosity
$\theta$	angle, angle of twist per unit length
$\kappa$	curvature
$\lambda$	extension ratio, wavelength

$\nu$	Poisson's ratio
$\rho$	density, electrical resistivity
$\Sigma_{ij}$	distortional stress
$\sigma$	normal stress
$\boldsymbol{\sigma}$	stress pseudovector
$\sigma_{ij}$	stress tensor
$\sigma_e$	endurance limit
$\sigma_f$	failure stress
$\sigma_m$	mean stress
$\sigma_M$	Mises stress
$\sigma_t$	true stress
$\sigma_Y$	yield stress
$\tau$	shear stress, relaxation time
$\phi$	Airy stress function
$\xi$	dummy length or time variable
$\Omega$	configurational probability
$\omega$	angular frequency
$\nabla$	gradient operator