

NOMENCLATURE

x, y, z	Rectangular coordinates
r, θ, ϕ	Polar coordinates
r, θ, z	Cylindrical coordinates
α, β, γ	Orthogonal curvilinear coordinates
ξ, η	Elliptical coordinates
X, Y, Z	Components of a body force per unit volume
$\bar{X}, \bar{Y}, \bar{Z}$	Components of a distributed surface force per unit area.
$(\sigma_x)_T, (\sigma_y)_T, (\sigma_z)_T$	Normal components of stress parallel to x-, y- and z- axes in the presence of temperature.
$(\widehat{xx})_T, (\widehat{yy})_T, (\widehat{zz})_T$	Normal components of stress parallel to x-, y- and z- axes in the presence of temperature.

$$(\widehat{rr})_T, (\widehat{\theta\theta})_T, (\widehat{\phi\phi})_T$$

Normal components of stress in polar coordinates in the presence of temperature.

$$(\widehat{rr})_T, (\widehat{\theta\theta})_T, (\widehat{zz})_T$$

Normal components of stress in cylindrical coordinates in the presence of temperature.

$$(\widehat{\alpha\alpha})_T, (\widehat{\beta\beta})_T$$

Normal components of stress in curvilinear coordinates in the presence of temperature.

$$(\widehat{\xi\xi})_T, (\widehat{\eta\eta})_T$$

Normal components of stress in elliptical coordinates in the presence of temperature.

$$(\sigma_x)_c, (\sigma_y)_c, (\sigma_z)_c$$

Normal stress components in cartesian coordinates in the absence of temperature.

$$(\widehat{xx})_c, (\widehat{yy})_c, (\widehat{zz})_c$$

Normal stress components in cartesian coordinates in the absence of temperature.

$$(\widehat{rr})_c, (\widehat{\theta\theta})_c, (\widehat{\phi\phi})_c$$

Normal components of stress in polar coordinates in the absence of temperature.

$(\widehat{rr})_c, (\widehat{\theta\theta})_c, (\widehat{zz})_c$

Normal components of stress in cylindrical coordinates in the absence of temperature.

 $(\widehat{\alpha\alpha})_c, (\widehat{\beta\beta})_c$

Normal components of stress in curvilinear coordinates in the absence of temperature.

 $(\widehat{\xi\xi})_c, (\widehat{\eta\eta})_c$

Normal components of stress in elliptical coordinates in the absence of temperature.

 $(\sigma_{xy})_T, (\sigma_{xz})_T, (\sigma_{zy})_T$

Shearing stress components in rectangular coordinates in the presence of temperature

 $(\widehat{xy})_T, (\widehat{yz})_T, (\widehat{zx})_T$

Shearing stress components in rectangular coordinates in the presence of temperature

 $(\widehat{r\theta})_T, (\widehat{\theta\phi})_T, (\widehat{r\phi})_T$

Shearing stress components in polar coordinates in the presence of temperature

 $(\widehat{r\theta})_T, (\widehat{\theta z})_T, (\widehat{zr})_T$

Shearing stress components in cylindrical coordinates in the presence of temperature.

$$(\widehat{\alpha\beta})_T, (\widehat{\beta\gamma})_T, (\widehat{\gamma\alpha})_T$$

Shearing stress components in curvilinear coordinates in the presence of temperature.

$$(\widehat{\xi\eta})_T, (\widehat{\eta z})_T, (\widehat{\xi z})_T$$

Shearing stress components in elliptical coordinates in the presence of temperature.

$$(\sigma_{xy})_c, (\sigma_{xz})_c, (\sigma_{zy})_c$$

Shearing stress components in cartesian coordinates in the absence of temperature.

$$(\widehat{r\theta})_c, (\widehat{\theta\phi})_c, (\widehat{r\phi})_c$$

Shearing components of stress in polar coordinates in the absence of temperature.

$$(\widehat{r\theta})_c, (\widehat{\theta z})_c, (\widehat{r z})_c$$

Shearing components of stress in cylindrical coordinates in the absence of temperature.

$$(\widehat{\alpha\beta})_c, (\widehat{\beta\gamma})_c, (\widehat{\gamma\alpha})_c$$

Shearing components of stress in curvilinear coordinates in the absence of temperature.

$$(\widehat{\xi\eta})_c$$

Shearing components of stress in elliptical coordinates in the absence of temperature.

$$u_T, v_T, w_T$$

Components of displacements in the presence

of temperature.

 $u_\alpha, u_\beta, u_\gamma$

Components of displacements in curvilinear coordinates.

 u_r, u_θ, u_ϕ

Components of displacements in polar coordinates.

 u_r, u_θ, u_z

Components of displacements in cylindrical coordinates.

 u_c, v_c, w_c

Components of displacements in the absence of temperature.

 $(\epsilon_x)_T, (\epsilon_y)_T, (\epsilon_z)_T$

Components of strain in the presence of temperature in the x, y z directions respectively.

 $(\epsilon_x)_c, (\epsilon_y)_c, (\epsilon_z)_c$

Components of strain in the absence of temperature in the x, y z directions respectively.

$\epsilon_r, \epsilon_\theta, \epsilon_\phi$	Components of strain in polar coordinates.
$\epsilon_r, \epsilon_\theta, \epsilon_z$	Components of strain in cylindrical coordinates.
E	Young's modulus.
G	Modulus of elasticity
σ, γ	Poisson's ratio.
$\mu = G, \lambda = \frac{\nu E}{(1+\nu)(1-2\nu)}$	Lame's constants.
ϕ	Stress function
t	time
T_0	Absolute temperature
T	Temperature
α	Coefficients of linear thermal expansion.
E_1, E_2	Young's moduli in the x and y directions respectively.

- ν_1 Ratio of the contraction parallel to x axis
to the extension parallel to y axis.
- ν_2 Ratio of the contraction parallel to y axis
to the extension parallel to x axis.
- α_1 Coefficient of linear thermal expansion in
the x axis.
- α_2 Coefficient of linear thermal expansion in
the y axis.
- α_3 Coefficient of linear thermal expansion in
the z axis.