

Equations for CE 2017 Exam #3

Stress / Strain Definitions

$$\sigma = \frac{N}{A} \quad \epsilon = \frac{\delta}{L_0}$$

$$\tau_{avg} = \frac{V}{A} \quad \gamma = \frac{\pi}{2} - \theta$$

Stress-Strain Relationships

$$\sigma = E\epsilon$$

$$\tau = G\gamma$$

$$\nu = -\frac{\epsilon_{lat}}{\epsilon_{long}}$$

$$G = \frac{E}{2(1+\nu)}$$

Axial Loading Deformation

$$\delta = \frac{NL}{AE}$$

$$\delta = \sum \frac{NL}{AE}$$

$$\delta = \int_0^L \frac{N(x)dx}{A(x)E(x)}$$

$$\delta_T = \alpha\Delta TL$$