

Topic

Axially Loaded Members

Governing Equations and Assumptions

$$\delta = \frac{PL}{EA} \quad \text{or} \quad \delta = \sum \frac{N_i L_i}{E_i A_i}$$

$$\sigma = \frac{P}{A}$$

$$\epsilon = \frac{\delta}{L}$$

$$\epsilon' = -\nu \epsilon$$

Process

- ① Determine the number of segments
=> Load changes
=> Area changes
- ② Determine the internal force for each segment
=> Draw internal forces in tension
- ③ Determine δ for each segment, and add to get the total displacement
(+) => elongation
(-) => shortening