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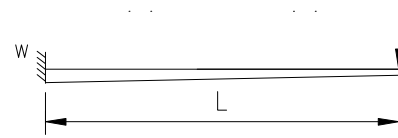
Description: Cantilever beam with end load.

Geometry:  $L := 2\text{ft}$

$r_i := 2"$   $r_e := 1"$

Properties:  $E := 29000\text{ksi}$

Loading:  $P := 1000\text{lbs}$



$$M(x) := P \cdot (L - x)$$

$$r(x) := r_i + \frac{(r_e - r_i) \cdot x}{L}$$

$$I(x) := \frac{\pi \cdot r(x)^4}{4}$$

$$\Delta := \int_0^L \frac{L - x}{E \cdot I(x)} \cdot M(x) \, dx \quad \Delta = 0.02529 \text{ in}$$

$$\Delta_{EdR} := \frac{4 \cdot P \cdot L^3}{3 \cdot \pi \cdot E \cdot r_e \cdot r_i^3} \quad \Delta_{EdR} = 0.02529 \text{ in}$$