

## TEMA 4

$$L := 3 \text{ m}$$

$$q_z := 2 \frac{\text{kN}}{\text{m}}$$

$$E := 200 \text{ GPa}$$

$$D := 15 \text{ cm}$$

$$e := 1 \text{ cm}$$

$$J_y := \frac{\pi}{64} \cdot \left( D^4 - (D - 2 \cdot e)^4 \right) = 1083,0641 \text{ cm}^4$$

Para que el giro en B sea nulo el  $M_t = 0$

$$M_x := q_z \cdot \frac{L^2}{2} = 9 \text{ kN m}$$

Desplazamiento del punto D

$$MD_{DV} := M_x = 9 \text{ kN m}$$

$$MD_{SE} := +1 \cdot \frac{L}{2} = 150 \text{ cm}$$

$$MA_{DV} := q_z \cdot L \cdot 2 \cdot L = 36 \text{ kN m}$$

$$MA_{SE} := +1 \cdot 2 \cdot L = 600 \text{ cm}$$

$$\eta_{Dmx} := \frac{1}{2} \cdot \frac{MD_{DV} \cdot MD_{SE}}{E \cdot J_y} \cdot \frac{L}{2} = 4,6742 \text{ mm}$$

$$\eta_{Dqz} := \frac{1}{3} \cdot \frac{MA_{DV} \cdot MA_{SE}}{E \cdot J_y} \cdot 2 \cdot L = 199,4342 \text{ mm}$$

$$\eta_D := \eta_{Dmx} + \eta_{Dqz} = 204,1084 \text{ mm}$$