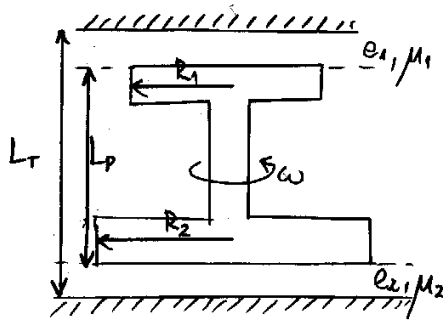


Pauta Ejercicio #1
C131A- Mecánica de Fluidos

a)



Para cada disco:

$$dT = r dF$$

$$dF = \tau dA$$

$$dA = r dr d\theta$$

$$\tau = \mu r \frac{d\omega}{dy}$$

$$dT = r \cdot \tau dA = \mu r^2 \frac{d\omega}{dy} r dr d\theta$$

$$dT = \mu r^3 \frac{d\omega}{dy} dr d\theta \quad \frac{d\omega}{dy} = \frac{\omega}{e}$$

$$dT = \mu r^3 \frac{\omega}{e} dr d\theta \quad / \int$$

$$\int_0^T dT = \int_0^R \int_0^{2\pi} \mu r^3 \frac{\omega}{e} d\theta dr = \mu \frac{R^4}{4} \frac{\omega}{e} \cdot 2\pi$$

$$T = \frac{\mu R^4 \omega \pi}{2e}$$

para el disco superior

$$T_1 = \frac{\mu_1 R_1^4 \omega \pi}{2e_1}$$

para el disco inferior

$$T_2 = \frac{\mu_2 R_2^4 \omega \pi}{2e_2}$$

pero $T_1 = T_2$

$$\Rightarrow \frac{\mu_1 R_1^4}{e_1} = \frac{\mu_2 R_2^4}{e_2}$$

$$\Rightarrow e_2 = e_1 \frac{\mu_2 R_2^4}{\mu_1 R_1^4} \quad (1)$$

$$L_T = L_P + e_1 + e_2 \quad (2)$$

$$(1) \text{ en } (2) \Rightarrow L_T = L_P + e_1 \left(1 + \frac{\mu_2 R_2^4}{\mu_1 R_1^4} \right)$$

$$\Rightarrow e_1 = \frac{L_T - L_P}{1 + \frac{\mu_2 R_2^4}{\mu_1 R_1^4}} = 5,8 \text{ mm}$$

$$e_2 = L_T - L_P - e_1 = 14,2 \text{ mm}$$

$$b) T_1 + T_2 = T_0 \quad (T_1 = T_2)$$

$$T_0 = 2 T_1 \quad (\text{o bien } T_0 = 2 T_2)$$

$$T_0 = 2 \frac{\mu_1 R_1^4 \omega \pi}{2 e_1} = \frac{\mu_1 R_1^4 \omega \pi}{e_1}$$

$$\Rightarrow \omega = \frac{e_1 T_0}{R_1^4 \mu_1 \pi} = 1,178 \frac{\text{rad}}{\text{s}}$$