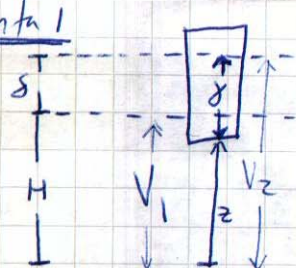


→ Pregunta 1

Control 3
F10A-2004



$$V_2 = V_1 + V_{\text{sumergido}}$$

$$V_2 = (H + \delta) \pi R_1^2 \quad (1.0)$$

$$V_1 = H \pi R_1^2$$

$$V_{\text{sumergido}} = y \pi R_2^2$$

$$z = H + \delta - y \quad (0.5)$$

$$\Rightarrow y = \frac{H - z}{1 - \left(\frac{R_2}{R_1}\right)^2}$$

$$\delta = y \left(\frac{R_2}{R_1}\right)^2$$

$$W = \rho_0 \pi R_2^2 h g$$

$$E = \rho_1 \pi R_2^2 y g$$

$$\Sigma F_z = m \ddot{z} = E - W \quad (1.0)$$

→ En el pto. de eq

$$\ddot{z} = 0 \Rightarrow$$

$$E = W$$

$$\rho_0 \pi R_2^2 h g = \rho_1 \pi R_2^2 \left(\frac{H - z}{1 - \left(\frac{R_2}{R_1}\right)^2} \right) g$$

$$\Rightarrow z_{\text{eq}} = H - \frac{\rho_0}{\rho_1} \left(1 - \left(\frac{R_2}{R_1}\right)^2 \right) h \quad (1.0)$$

→ Si $\ddot{z} \neq 0$ entonces

$$m = \rho_0 \pi R_2^2 h$$

$$\ddot{z} + \underbrace{\frac{\rho_1}{\rho_0 h \left(1 - \left(\frac{R_2}{R_1}\right)^2 \right)}}_{\omega^2} g z = \left(\frac{\rho_1 H}{\rho_0 h \left(1 - \frac{R_2^2}{R_1^2} \right)} - 1 \right) g \quad (0.5)$$

$$z = z_{\text{eq}} + \Delta z \Rightarrow \ddot{z} + \omega^2 \cdot \Delta z = 0 //$$

↳ M.A.S.

$$\omega = \sqrt{\frac{\rho_1 \cdot z_1^2 g}{\rho_0 h (R_1^2 - R_2^2)}}$$