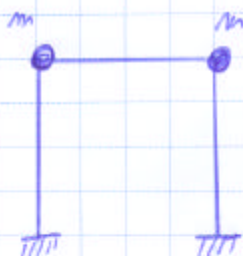


Fecha:

Pauta Ejercicio 3 CI426

Fmp

P2



$$x(t) = q e^{-\beta \omega t} \cos(\omega_d t - \theta)$$

$$A_{3\text{seg}} = 0,5 \cdot q \cdot e^{-\beta \omega \cdot 3\text{seg}}$$

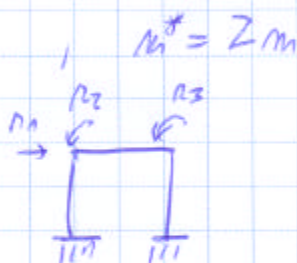
$$\Rightarrow \frac{q \cdot e^{-\beta \omega \cdot 3\text{seg}}}{q} = 0,50 \Rightarrow -\beta \omega \cdot 3\text{seg} = \ln(0,5)$$

$$\Rightarrow \omega = \frac{-\ln(0,5)}{0,04 \cdot 3\text{seg}}$$

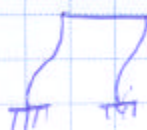
$$\Rightarrow \omega = 5,776 \frac{\text{rad}}{\text{seg}} \Rightarrow T = 1,080 \text{ seg}$$

Luego $\omega = \sqrt{\frac{k^*}{m^*}}$

- Obtenemos k^* :



$$k_1 = 1, k_2 = k_3 = 0$$



$$\Rightarrow k_{11} = \frac{24 EI}{l^3} \quad k_{12} = k_{13} = \frac{6 EI}{l^2}$$

Fecha:

$$n_2 = 1, n_1 = n_3 = 0$$



$$K_{22} = \frac{8EI}{l} \quad K_{32} = \frac{2EI}{l}$$

$$K_{33} = \frac{8EI}{l}$$

$$\Rightarrow [K] = \begin{bmatrix} K_{aa} & K_{ap} & K_{ap} \\ \frac{24EI}{l^3} & \frac{6EI}{l^2} & \frac{6EI}{l^2} \\ \frac{6EI}{l^2} & \frac{8EI}{l} & \frac{2EI}{l} \\ \frac{6EI}{l^2} & \frac{2EI}{l} & \frac{8EI}{l} \end{bmatrix}$$

$$\hat{K}^* = (K_{aa} - K_{ap} K_{pp}^{-1} K_{pa})$$

$$b^* = \frac{24EI}{l^3} - (1 \ 1) \cdot \frac{6EI}{l^2} \cdot \frac{1}{\left(\frac{8EI}{l}\right) - \left(\frac{2EI}{l}\right)^2} \begin{bmatrix} 8 & -2 \\ -2 & 8 \end{bmatrix} \frac{EI}{l} \cdot \begin{pmatrix} 1 \\ 1 \end{pmatrix} \frac{6EI}{l^2}$$

$$b^* = \frac{24EI}{l^3} - \frac{36 \left(\frac{EI}{l^2}\right)^2 \cdot EI}{\left(\frac{8EI}{l}\right)^2 - \left(\frac{2EI}{l}\right)^2} \cdot (1 \ 1) \begin{pmatrix} 6 \\ 6 \end{pmatrix}$$

$$b^* = \frac{24EI}{l^3} - \frac{432}{60} \frac{EI}{l^3} = \frac{84}{5} \frac{EI}{l^3}$$

$$\Rightarrow \omega = 5,776 = \sqrt{\frac{84 EI}{10 l^3 m}}$$

Fecha:

$$\Rightarrow \frac{5776^2}{\text{kg}^2} \cdot 10 \cdot (1,5 \text{ m})^3 \cdot \frac{1 \text{ ton}}{9,8 \text{ m}} \cdot \frac{1}{84 \cdot 2.100.000 \text{ kg}} \cdot \frac{\text{cm}^2}{\text{m}^2} = I$$

$$E = 2.100.000 \frac{\text{kg}}{\text{cm}^2} = 21.000.000 \frac{\text{ton}}{\text{m}^2}$$

$$\Rightarrow I = (5776)^2 \cdot 10 \cdot (1,5)^3 \cdot \frac{1}{9,8} \cdot \frac{1}{84} \cdot \frac{1}{21.000.000} \text{ m}^4$$

$$I = 6,51 \times 10^{-8} \text{ m}^4$$

$$I = 6,513 \text{ cm}^4$$