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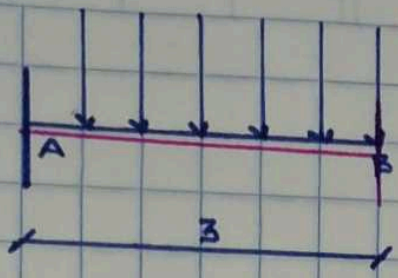
MATERIA: ANALISIS DE UNA ESTRUCTURA

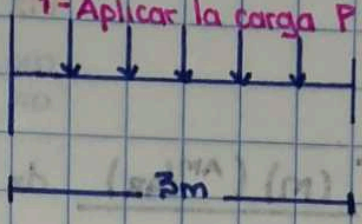
TEMA: INESTIBILIDAD ELASTICA

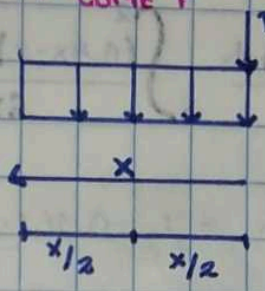
PARCIAL: 4TO

LICENCIATURA: LICENCIATURA EN ARQUITECTURA

CUTRIMESTRE: 4TO







$M = -P(x) - 2(x/2)$

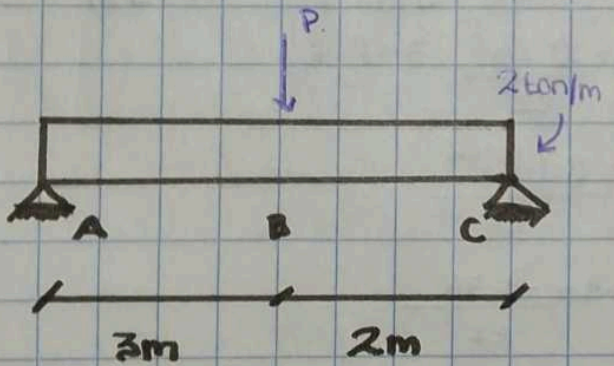
$= -P(x) - x^2$

$$\Delta_0 \theta = \int_0^L \frac{(m)\,(M_m/A_R)\,dx}{EI}$$

$$\Delta = \int_0^3 (+x^2)(-x)\,dx$$

$\frac{(3)^4}{4} - \frac{(0)^4}{4} = \frac{81}{4} = 20.25$

20.25



Determinar la deflexión en el punto "B" de la viga

1- Aplicar la carga (P)

$C_y(5m) - 2\,ton/m + P(3m) = 0$

$C_y = 2\,ton\cdot m/5m + P(3m/5m)$

$C_y = 0.4\,ton + 0.6P$

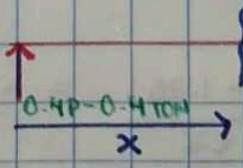
$A_y - P + C_y = 0$

$A_y = P - (0.4\,ton - 0.6P)$

$A_y = 0.4P - 0.4\,TON$

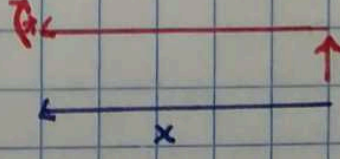
P= 1

CORTE 1 $\quad 0 \le x \le 3$



$M_1 = 0.4P(x) - 0.4\,ton(x)$

CORTE 2 $\quad 0 \le x \le 2$



$M_2 = 0.4\,ton(x) + 0.6P(x) - 2$

M1

$\frac{\partial M}{\partial R} = 0.4x$

M2

$\frac{\partial M}{\partial R} = 0.6x$

FORMULA $\Delta = \int_0^L \frac{(M)\left(\partial M/\partial R\right)}{EI}\, dx$

$$\Delta = \int_0^3 \frac{(-0.4x)(0.4x)\,dx}{EI} \int_0^2 \frac{(0.4x-2)(0.6x)\,dx}{EI}$$

$$\Delta = \int_0^3 (-0.16x^2)\,dx = \frac{1}{EI}\left[-0.16\frac{(x^{n+1})}{n+1}\right]_0^3 = \frac{1}{EI}\left[0.16\frac{(x^{2+1})}{2+1}\right]_0^3 =$$

$$\frac{1}{EI}\left[\frac{-0.16x^3}{3}\right]_0^3 = \frac{1}{EI}\left(-0.053x^3\right)\Big|_0^3 = \frac{(0.053x^3}{EI} = \frac{-0.053(3)^3}{EI} =$$

$$\frac{0.053(0)^3}{EI} = \frac{0.053(27)}{EI} = \frac{-1.431}{EI}$$

$$\Delta = \int_0^2 (0.24x^2 - 1.2x)\,dx = \frac{1}{EI}\left[0.24\frac{(x^{2+1})}{2+1}\right]_0^2 - \left[1.2\frac{(x^{1+1})}{1+1}\right]_0^2 =$$

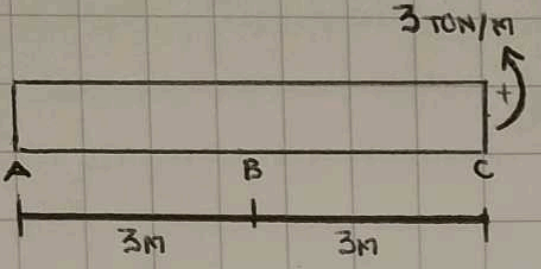
$$\frac{1}{EI}\frac{0.08x^3}{1} - \frac{1}{EI}\frac{0.6x^2}{1} = \frac{0.08x^3}{EI} - \frac{0.6x^2}{EI} = I - F$$

$$\frac{0.08(2)^3}{EI} - \frac{0.08(0)^3}{EI} - \frac{0.6(2)^2}{EI} - \frac{0.6(0)^2}{EI}$$

$$\frac{0.08(8)}{EI} - \frac{0.6(4)}{EI} = \frac{0.64 - 2.4}{EI} = \frac{-1.76}{EI}$$

$$\Delta = \frac{(-1.431)}{EI} - \frac{(-1.76)}{EI} = + \frac{3.191}{EI} \uparrow$$

DETERMINAR LA DEFLEXIÓN EN EL CENTRO DE LA VIGA



1- Aplicar carga P

$C_Y(6m) + 3\,ton/m + P(3m) = 0$

$C_Y = +3\,ton/m\,/6m + P(3m/6m)$

$C_Y = +0.5\,ton + 0.5P$

$A_Y - P + C_Y = 0$

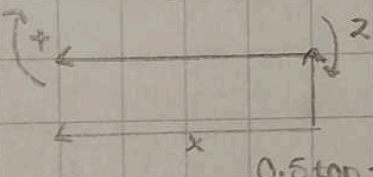
$A_Y = P - (+0.5\,ton + 0.5P)$

$A_Y = 0.5P + 0.5\,ton$

CORTE 1 $\quad 0 \leq x \leq 3$

$M_1 = 0.5p(x) + 0.5\,ton(x)$

CORTE 2 $\quad 0 \leq x \leq 3$



$M_2 = -0.5\,ton(x) + 0.5p(x) + 3$

$AM/AR = 0.5x \rightarrow M_1$

$AM/AR = 0.5x \rightarrow M_2$

FORMULA $\quad \Delta = \int_0^L \frac{(M)(AM/AR)}{EI}\,dx$

$$\Delta = \int_0^3 \frac{(-0.5x)(0.5x)\,dx}{EI} \qquad \int_0^3 \frac{(-0.5x+3)(0.5x)\,dx}{EI}$$

$$\Delta = \int_0^3 \frac{-0.25x^2\,dx}{EI} \qquad \int_0^3 \frac{(0.25x^2 + 1.5x)\,dx}{EI}$$

$$\Delta = -0.25\,\frac{(x^{2+1})}{2+1}\Big|_0^3 \qquad 0.25\,\frac{(x^{2+1})}{2+1} + 1.5\,\frac{(x+1)}{1+1}\Big|_0^3$$

$$\Delta = \frac{-0.25x^3}{3} \qquad \frac{0.25x^3}{3} + \frac{1.5x^2}{2}$$

$$\Delta = -\frac{0.0833x^3}{IE} + \frac{0.0833x^3}{IE} + \frac{0.75x^2}{IE}$$

Silky

$$\Delta = -\frac{0.0833(3)^3}{IE} + \frac{0.0833(3)^3}{IE} + \frac{0.75(3)^2}{IE}$$

$$\Delta = -\frac{0.0833(27)}{IE} + \frac{0.0833(27)}{IE} + \frac{0.75(9)}{IE}$$

$$\Delta = -\frac{2.2491}{EI} + \frac{2.2491}{EI} + \frac{6.75}{EI}$$

$$\Delta = \frac{6.75}{EI}$$