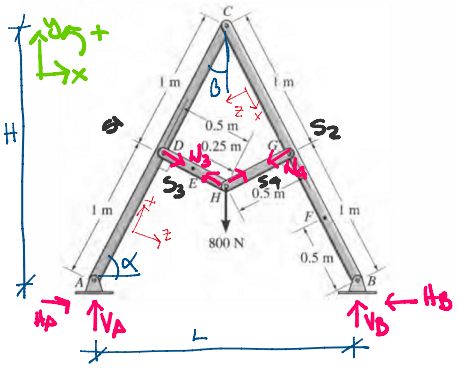
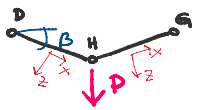
Ejercicios Alumnos_v2

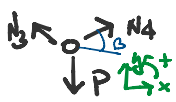
miércoles, 9 de junio de 2021 7:39 p. m.

SIMETRÍA

7-34. Determine la fuerza normal interna, la fuerza cortante y el momento flexionante en los puntos E y F del marco.







$\Sigma F_x = 0 \rightarrow N_3 - N_4 = 893,3N$

$\Sigma F_y = 2N_3 \cdot \operatorname{sen}(B) - P = 0$

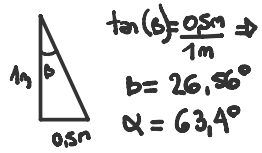
$\hookrightarrow N_3 = \frac{P}{2\operatorname{sen}(B)} = 894,43N$ (tracción)

$\Sigma F_V = V_A + V_B - P = 0 \rightarrow V_A = P/2 = 400N$

$\Sigma F_H = H_A - H_B = 0 \Rightarrow H_A = H_B \rightarrow H_A = -300N$

$\Sigma M^A = -P\cdot\frac{L}{2} + V_B \cdot L = 0 \Rightarrow V_B = \frac{P}{2} = 400N$

$\Sigma M^C_{S_2} = -N_4 \cdot 1m - H_B \cdot H + V_B \cdot \frac{L}{2} = 0 \rightarrow H_B = -300N$



$\tan(B) = \frac{0,5m}{1m} \Rightarrow$

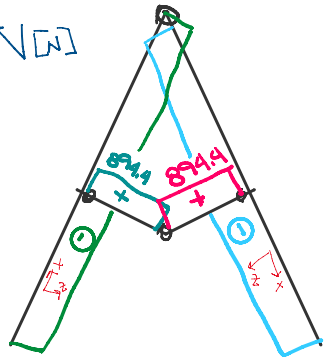
$B = 26,56°$

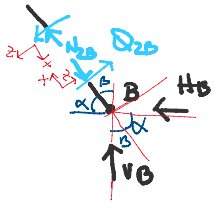
$\alpha = 63,4°$

$\frac{L}{2} = 2m \cdot \operatorname{sen}(B) \Rightarrow L \cong 1,79M$

$H = 2m \cdot \cos(B) \Rightarrow H \cong 1,79M$

N [N]



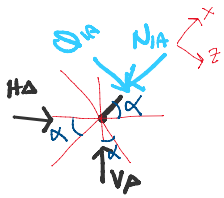


$\Sigma F_x = -N_{2B} + H_B \cdot \cos(\alpha) + V_B \cdot \cos(B) = 0$

$N_{2B} = 223,6N$ (compresión)

$\Sigma F_z = Q_{2B} - H_B \cdot \operatorname{sen}(\alpha) + V_B \cdot \operatorname{sen}(B) = 0$

$Q_{2B} = -447,2N$



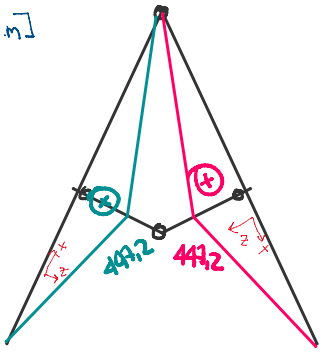
$\Sigma F_x = -N_{1A} + H_A \cdot \cos(\alpha) + V_A \cdot \operatorname{sen}(\alpha) = 0$

$N_{1A} = 223,6N$ ✓ (de simetría)

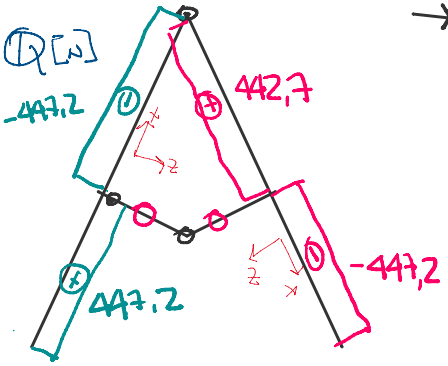
$\Sigma F_z = Q_{1A} - V_A \cdot \cos(\alpha) + H_A \cdot \operatorname{sen}(\alpha) = 0$

$Q_{1A} = 447,2N$ ✓ (de Antisimetría)

M [N.m]



Q [N]



Punto E: $N_E = 894,4N$, $Q_E = 0$, $M_E = 0$

Punto F: $N_F = -223,6N$, $Q_F = -447,2N$, $M_F = 223,6N.M$