

Equacion de compatibilidad

$$\Delta_{Bx0} + \delta_{BxBx} B_x + \delta_{BxB_y} B_y + \delta_{BxB} M_B = 0$$

$$\Delta_{By0} + \delta_{ByB_x} B_x + \delta_{ByB_y} B_y + \delta_{ByB} M_B = 0$$

$$\theta_{B0} + \theta_{BB_x} B_x + \theta_{BB_y} B_y + \theta_{BB} M_B = 0$$

Segmento Límites Origen M_0 m_x m_y M_0

AC

0-30

A

$-1800 + 20x$

$-x$

40

1

CD

0-40

D

$-0.75x^2$

-30

x

1

DB

0-30

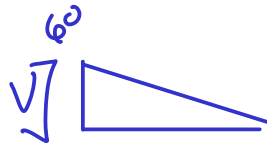
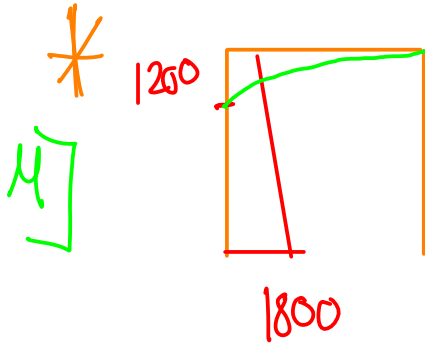
B

0

x

0

-1



$$\Delta_{XO} := \int_0^{30} (-1800 + 20 \cdot x) \cdot (-x) dx + \int_0^{40} \frac{(-0.75 \cdot x^2) \cdot (-30)}{2} dx + \int_0^{30} (0) \cdot (x) dx = 8.7 \cdot 10^5$$

$$\Delta_{YO} := \int_0^{30} (-1800 + 20 \cdot x) \cdot (40) dx + \int_0^{40} \frac{(-0.75 \cdot x^2) \cdot (x)}{2} dx + \int_0^{30} (0) \cdot (0) dx = -2.04 \cdot 10^6$$

$$\theta_{BO} := \int_0^{30} (-1800 + 20 \cdot x) \cdot (1) dx + \int_0^{40} \frac{(-0.75 \cdot x^2) \cdot (1)}{2} dx + \int_0^{30} (0) \cdot (-1) dx = -53000$$

$$\delta_{xx} := \int_0^{30} (-x)^2 dx + \int_0^{40} \frac{(-30)^2}{2} dx + \int_0^{30} (x)^2 dx = 36000$$

$$\delta_{yy} := \int_0^{30} (40)^2 dx + \int_0^{40} \frac{(x)^2}{2} dx + \int_0^{30} (0)^2 dx = 58666.6667$$

$$\theta_{BB} := \int_0^{30} (1)^2 dx + \int_0^{40} \frac{(1)^2}{2} dx + \int_0^{30} (-1)^2 dx = 80$$

$$\delta_{yx} := \delta_{xy}$$

$$\delta_{xy} := \int_0^{30} (-x) \cdot (40) dx + \int_0^{40} \frac{(-30) \cdot (x)}{2} dx + \int_0^{30} (x) \cdot (0) dx = -30000$$

$$\delta_{\theta x} := \delta_{x\theta}$$

$$\delta_{x\theta} := \int_0^{30} (-x) \cdot (1) dx + \int_0^{40} \frac{(-30) \cdot (1)}{2} dx + \int_0^{30} (x) \cdot (-1) dx = -1500$$

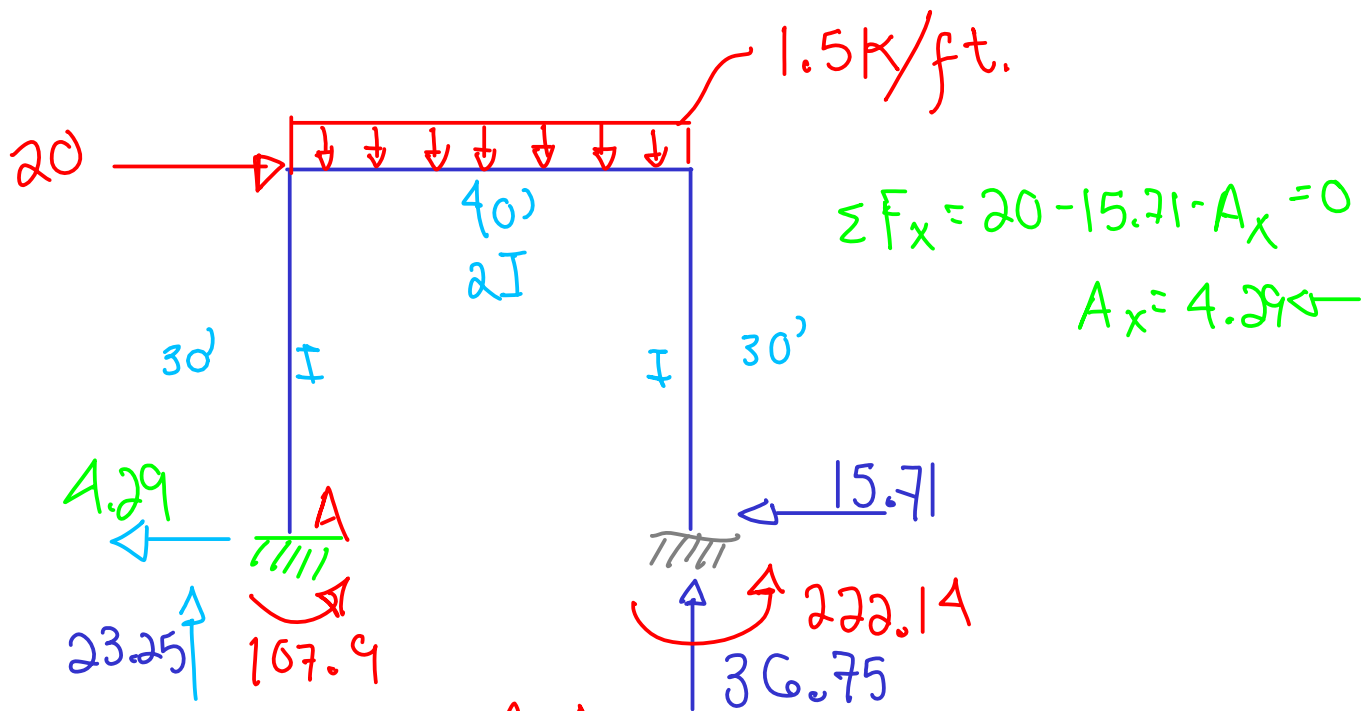
$$\delta_{\theta y} := \delta_{y\theta}$$

$$\delta_{y\theta} := \int_0^{30} (40) \cdot (1) dx + \int_0^{40} \frac{(x) \cdot (1)}{2} dx + \int_0^{30} (0) \cdot (-1) dx = 1600$$

Ecuaciones de compatibilidad:

$$\begin{bmatrix} \delta_{xx} & \delta_{xy} & \delta_{x\theta} \\ \delta_{yx} & \delta_{yy} & \delta_{y\theta} \\ \delta_{\theta x} & \delta_{\theta y} & \theta_{BB} \end{bmatrix} = \begin{bmatrix} 36000 & -30000 & -1500 \\ -30000 & 58666.6667 & 1600 \\ -1500 & 1600 & 80 \end{bmatrix}$$

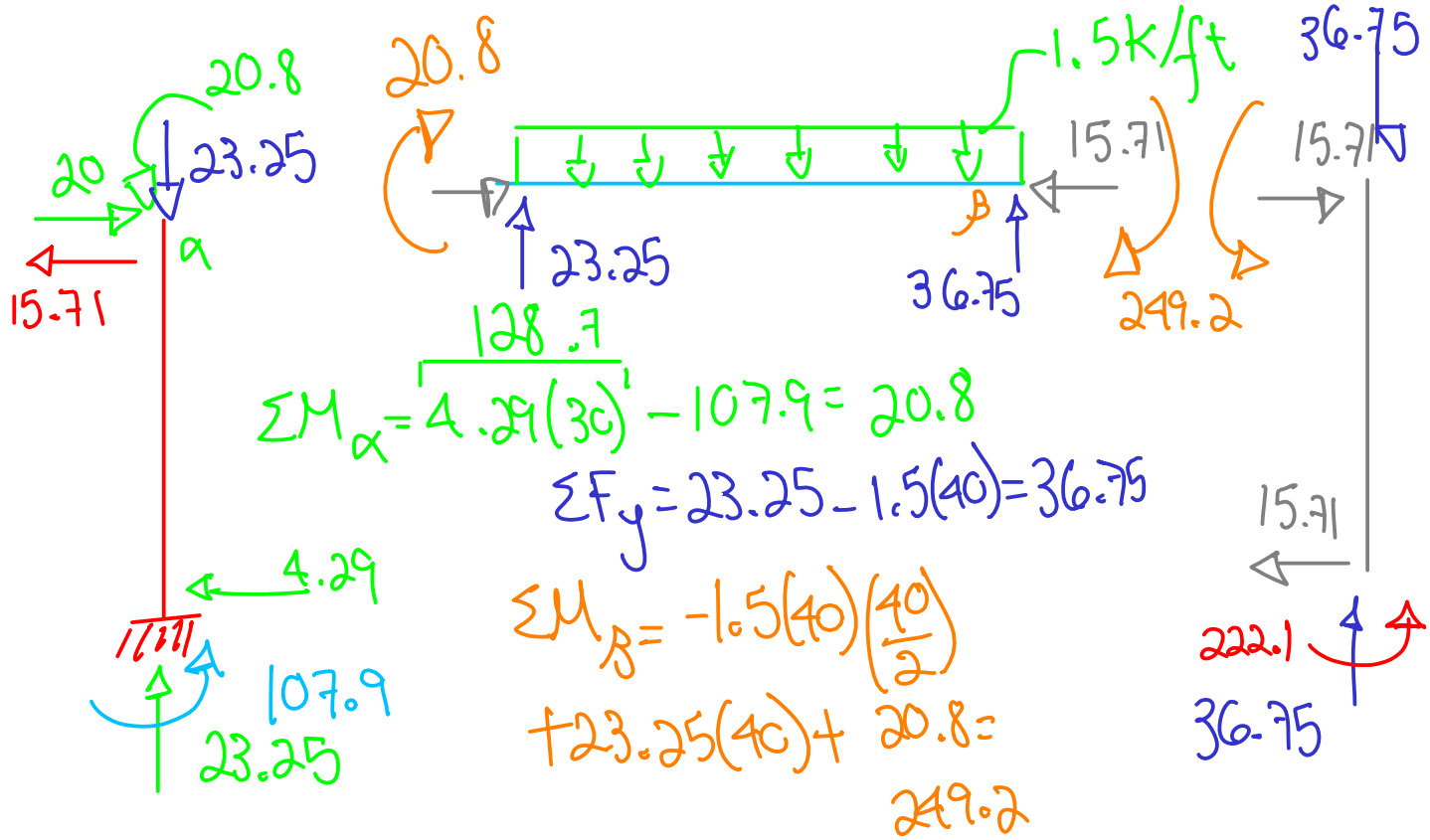
$$\begin{bmatrix} \delta_{xx} & \delta_{xy} & \delta_{x\theta} \\ \delta_{yx} & \delta_{yy} & \delta_{y\theta} \\ \delta_{\theta x} & \delta_{\theta y} & \theta_{BB} \end{bmatrix}^{-1} \cdot \begin{bmatrix} -\Delta_{XO} \\ -\Delta_{YO} \\ -\theta_{BO} \end{bmatrix} = \begin{bmatrix} 15.7143 \\ 36.75 \\ 222.1429 \end{bmatrix}$$



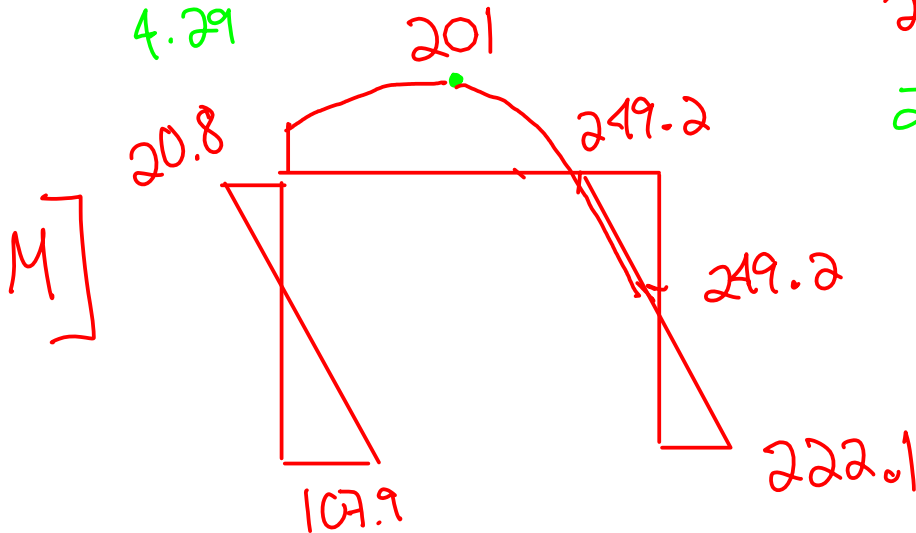
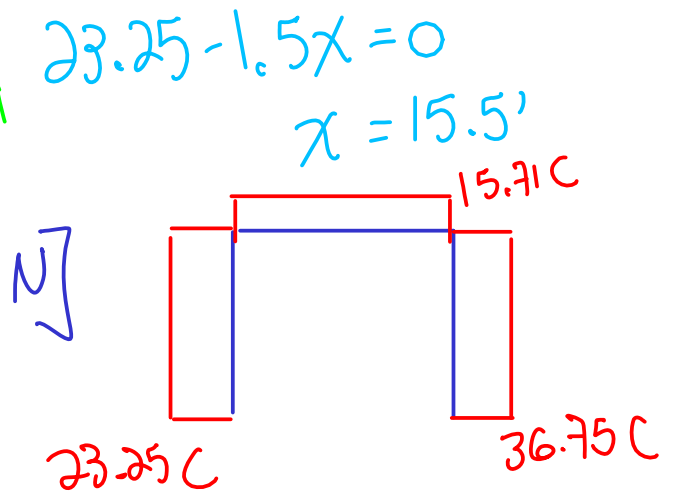
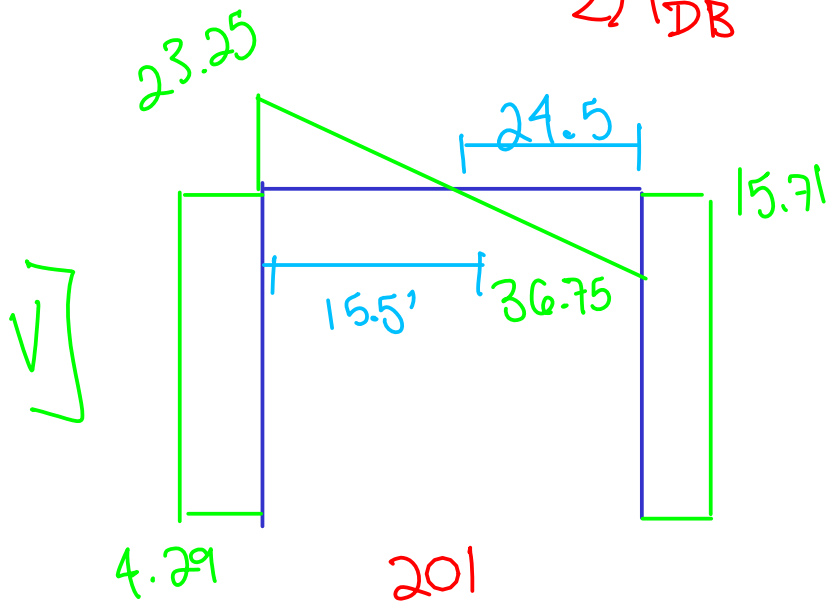
$$\sum M_A = 20(30) + 1.5(40)\left(\frac{40}{2}\right) - 222.14 - 36.75(40) + M_A = 0$$

$$M_A = -107.9 \curvearrowright = 107.9 \curvearrowleft$$

$$\sum F_y = -1.5(40) + 36.75 + A_y = 0 \quad \therefore A_y = 23.25 \uparrow$$



$$\Sigma M_{DB} = 15.71(30) - 222.1 - 249.2 \approx 0$$



$$20.8 + \frac{1}{2}(15.5)(23.25) = M_{max} = 201$$