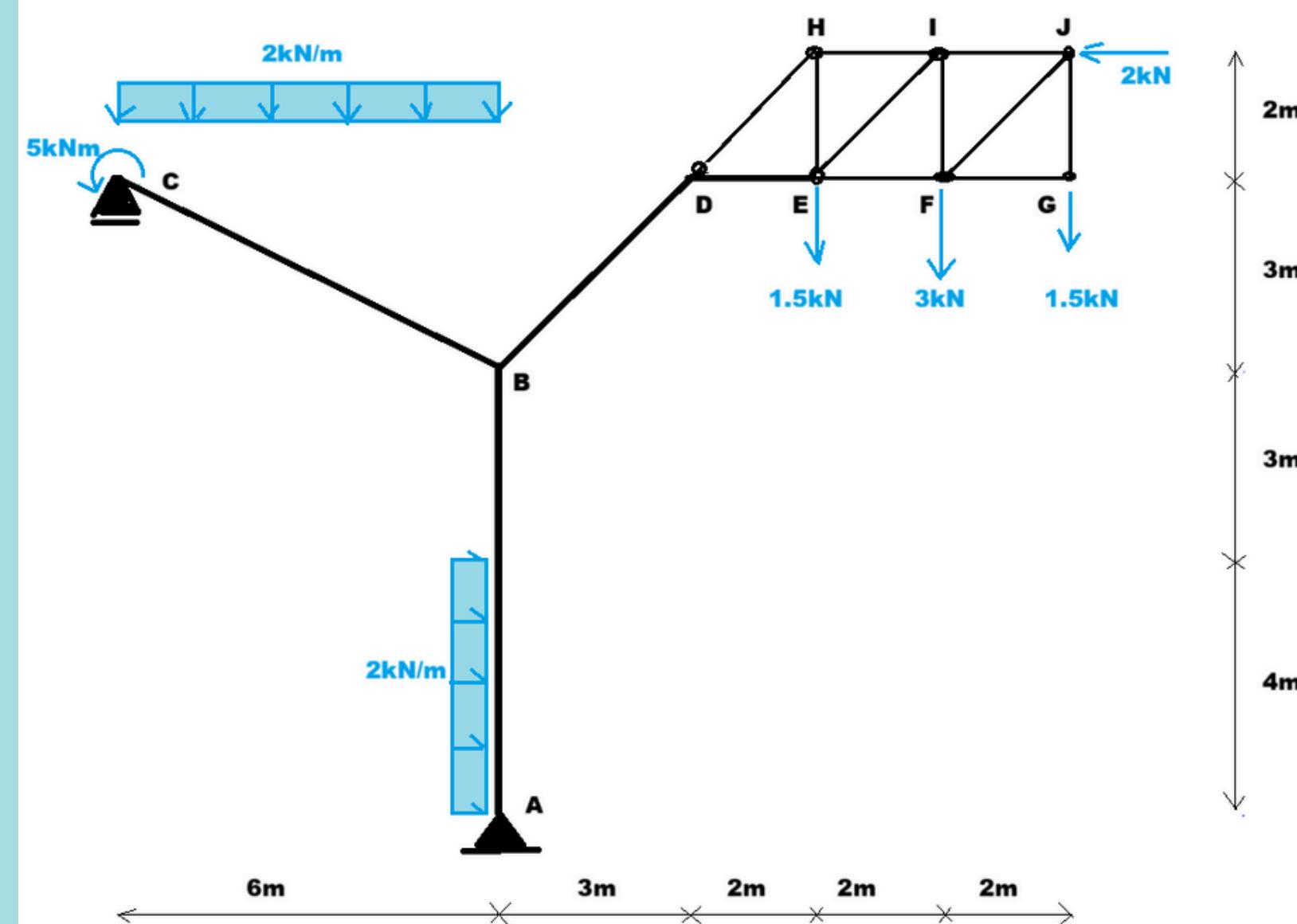


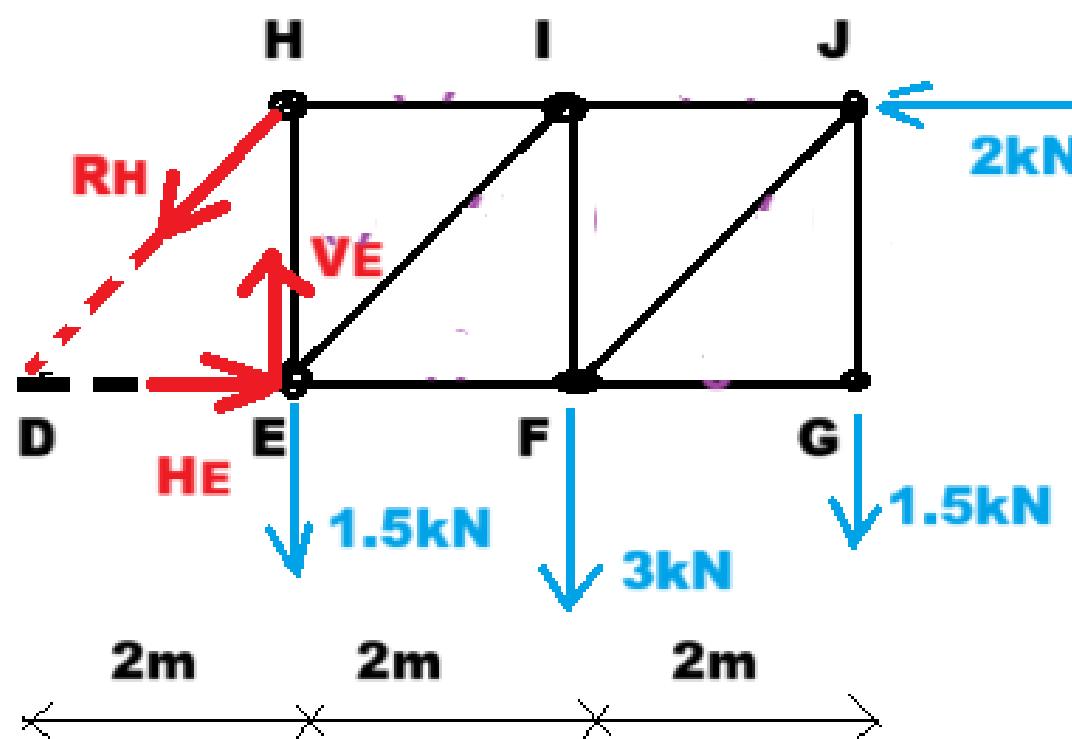


# Verificar isostaticidad y estabilidad cinemática

Paso 1



## Reticulado



$$\sum M_E = 0$$

$$\sum M_H = 0$$

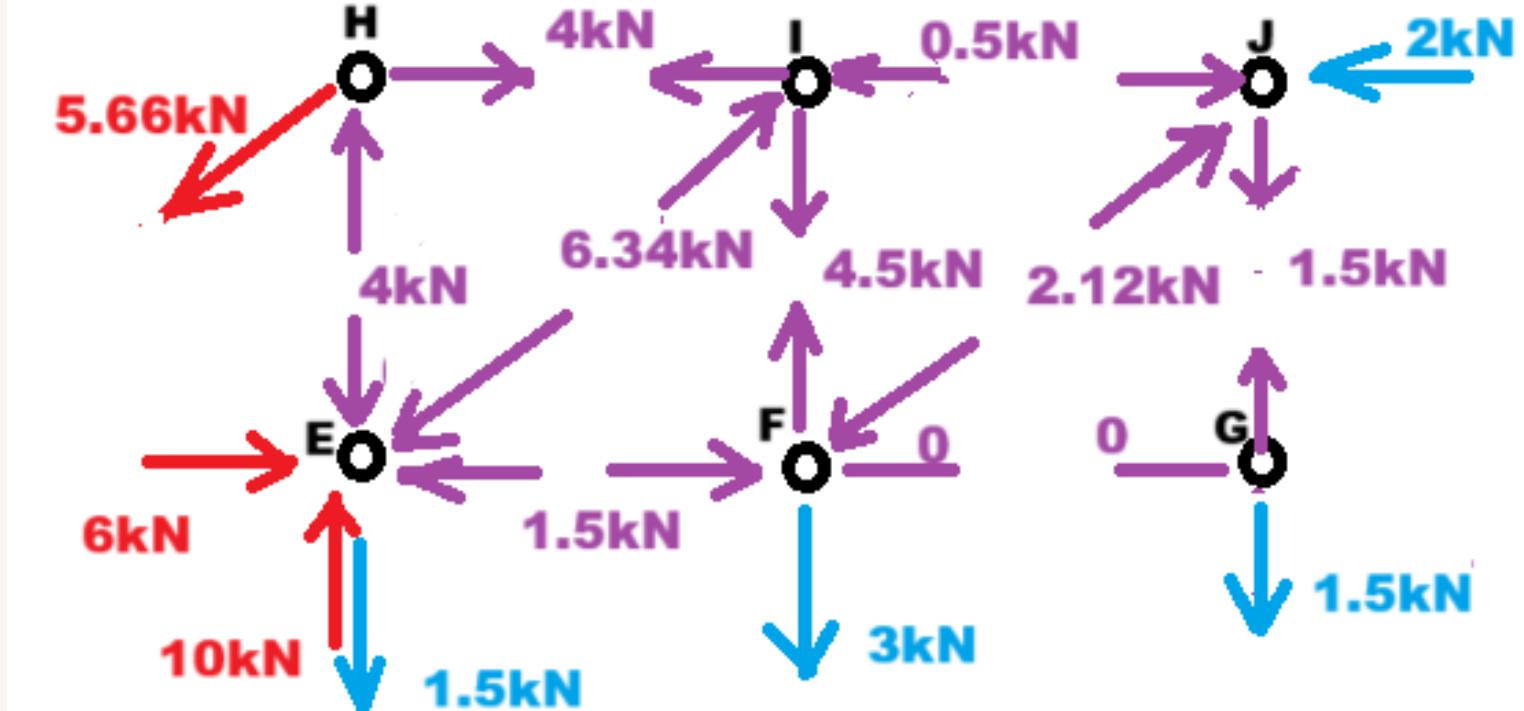
$$\sum M_G = 0$$

$$R_H = 5.66 \text{ kN}$$

$$H_E = 6 \text{ kN}$$

$$V_E = 10 \text{ kN}$$

## Método de los Nudos



En este método se plantean las ecuaciones de equilibrio en cada nudo. Como es un sistema de fuerzas concurrentes, las ecuaciones de equilibrio son 2.

$$\sum F_x = 0$$

$$\sum F_y = 0$$

## Pórtico

### Cálculo de reacciones de vínculos

Se tienen en cuenta las acciones que ejerce el reticulado sobre el pórtico

$$\sum M_A = 0$$

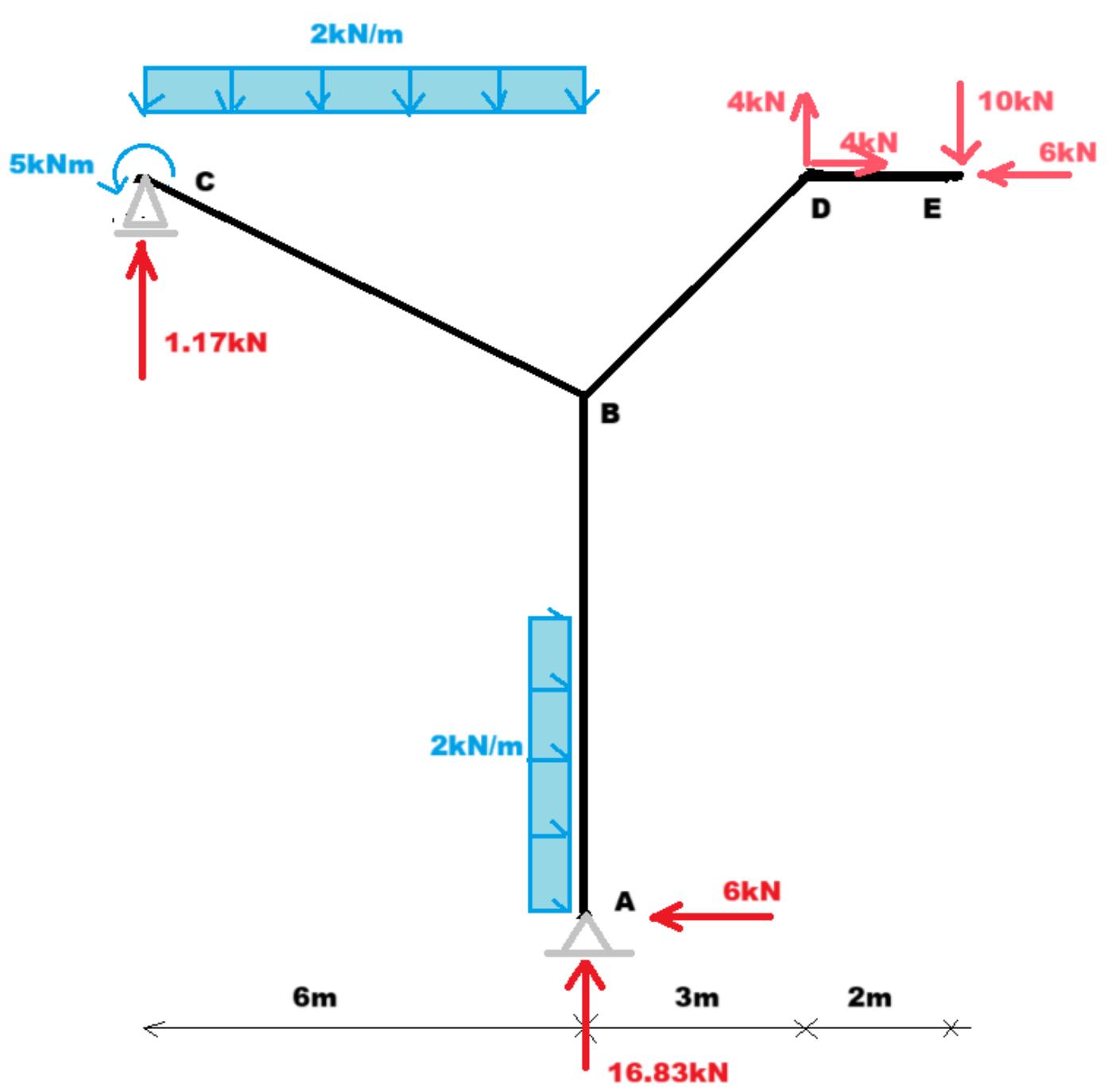
$$V_C = 1.17 \text{ kN}$$

$$\sum F_x = 0$$

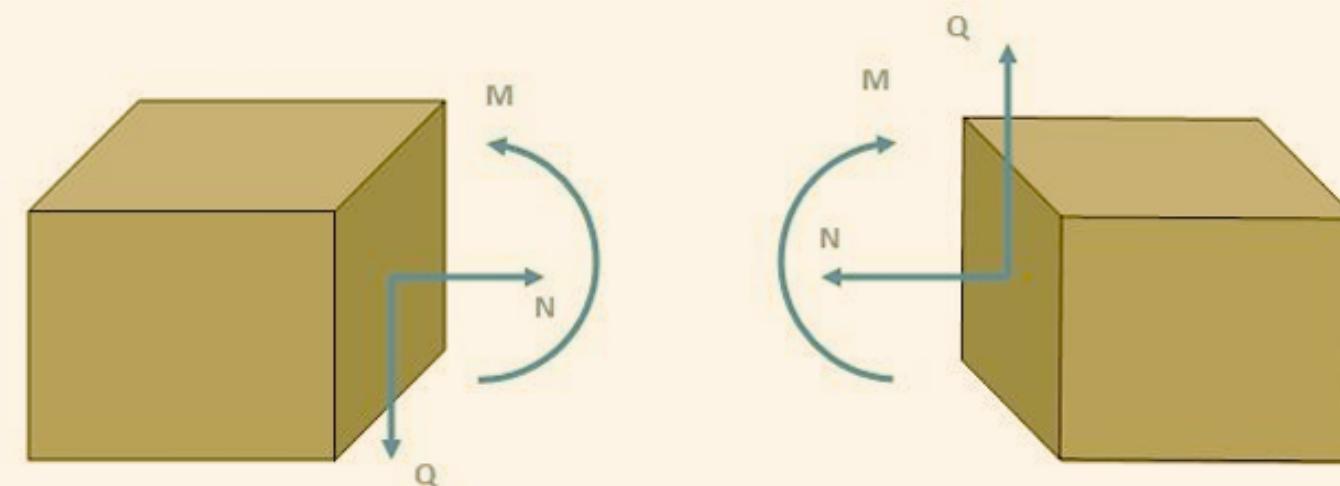
$$H_A = 6 \text{ kN}$$

$$\sum M_C = 0$$

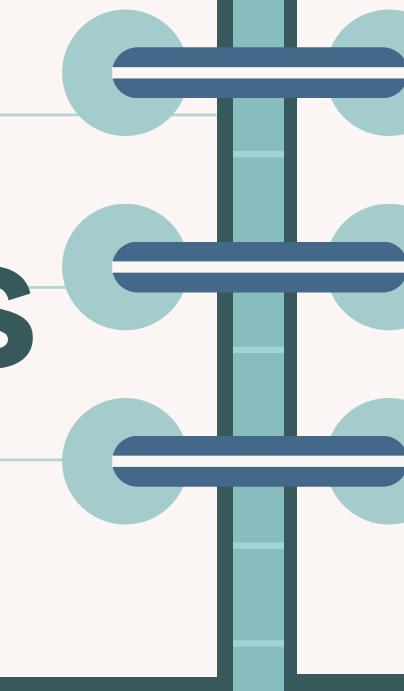
$$V_A = 16.83 \text{ kN}$$



## Esfuerzos Internos



# Convención de signos positivos



## 1 Por equilibrio

$$Q_1 = V_A - q \cdot 3$$

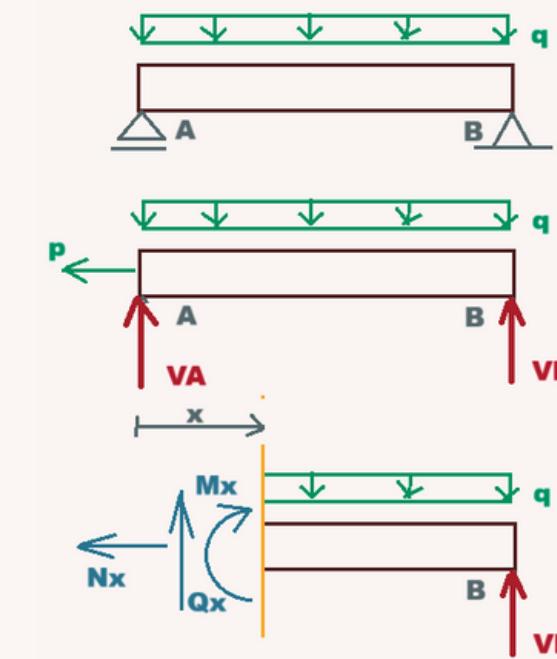
$$M_1 = V_A \cdot x - 3 \cdot x \cdot x/2$$

$$Q_1 - P \sin \alpha = -V_B$$

$$M_1 + Q_1 \cdot 3 - P \sin \alpha \cdot 3 = 0$$

$$-P \cos \alpha = H_B$$

## 2 Planteando ley de variación

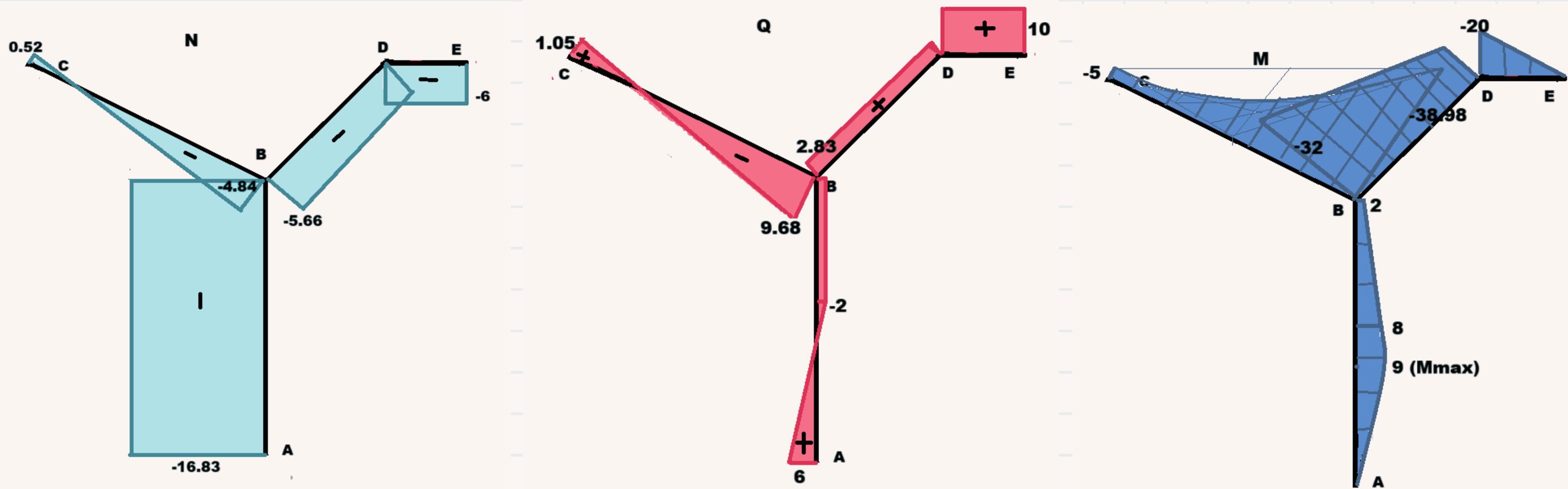


$$N_x = P$$

$$Q_x = V_A - q \cdot x$$

$$M_x = V_A \cdot x - q \cdot \frac{x^2}{2}$$

## Diagramas



$$-p = \frac{dN}{dx}$$

$$-q = \frac{dQ}{dx}$$

$$Q = \frac{dM}{dx}$$

## Equilibrio

