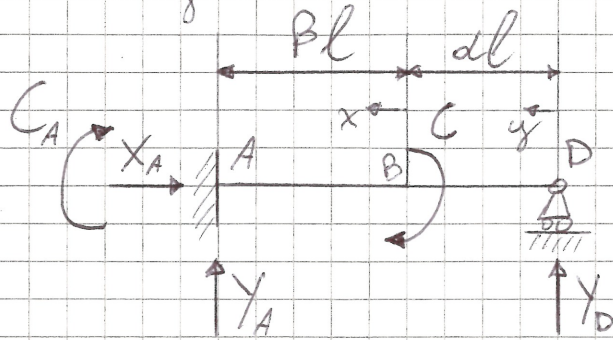
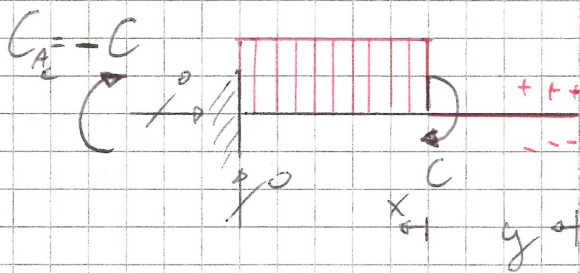


Esercizio 2.13.

Considera la seguente struttura staticamente indeterminata.



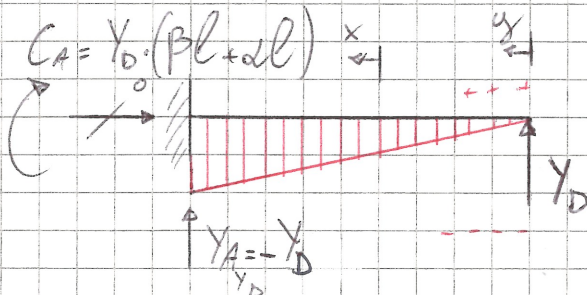
Considera la seguente struttura principale caricata dalla sola C .



$$M_f(x)_C = C$$

$$M_f(y)_C = 0$$

Considera la stessa struttura principale, ma caricata ora dalla sola reazione iperstatica Y_D .



$$M_f(x)_{Y_D} = -Y_D \cdot (x + dl)$$

$$M_f(y)_{Y_D} = -Y_D \cdot y$$

Calcoli di Π_f generati dal carico esplorativo. Mi accorgo che basta sostituire 1 a Y_D .

$$\Pi_f(x)_1 = -1 \cdot (-x - \alpha l)$$

$$\Pi_f(y)_1 = -1 \cdot y$$

Applico il P.L.V.

$$h_e = h_i$$

$$L_e = 1 \cdot \delta' = 0$$

$$\begin{aligned} h_i &= \int_0^{\beta l} \frac{1}{ES} (C - Y_D \cdot x - Y_D \cdot \alpha l) \cdot (-x - \alpha l) dx + \int_0^{\alpha l} \frac{1}{ES} (C - Y_D \cdot y) \cdot (-y) dy = \\ &= \frac{1}{ES} \int_0^{\beta l} -C \cdot x - C \cdot \alpha \cdot l + Y_D \cdot x^2 + Y_D \cdot \alpha l x + Y_D \cdot \alpha l x + Y_D \cdot \alpha^2 l^2 dx + \int_0^{\alpha l} -Y_D y^2 dy = \\ &= \frac{1}{ES} \left(-C \cdot \beta \frac{l^2}{2} - C \cdot \alpha \cdot \beta \cdot l^2 + Y_D \cdot \beta^3 \frac{l^3}{3} + Y_D \cdot \alpha \cdot \beta \cdot \frac{l^3}{2} \cdot 2 + Y_D \cdot \alpha^2 \beta l^3 + Y_D \alpha \frac{l^3}{3} \right) = \\ &= 0 \end{aligned}$$

$$\rightarrow Y_D \cdot l^3 \left(\frac{\beta^3}{3} + \alpha \beta^2 + \alpha^2 \beta + \frac{\alpha^3}{3} \right) = C l^2 \left(\frac{\beta^2}{2} + \alpha \beta \right)$$

$$Y_D = \frac{C}{l} \cdot \frac{\left(\frac{\beta^2}{2} + \alpha \beta \right)}{\frac{\beta^3}{3} + \alpha \beta^2 + \alpha^2 \beta + \frac{\alpha^3}{3}}$$