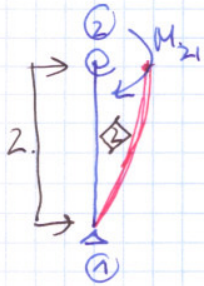


$$\Delta_{12} = \Delta_{34}$$

$$\theta_2, \theta_3, \Delta_{12}$$

$$= -1 + 1.5EI\theta_2 + 0.75EI\Delta_{12}$$



$$M_{21} = \frac{7EI\theta_2}{8} + \frac{3EI}{L}\theta_2 + \frac{3EI}{L^2}\Delta_{12} = -\frac{2 \cdot 4}{8} + \frac{3}{2}EI\theta_2 + \frac{3}{4}EI\Delta_{12}$$

$$M_{12} = 0$$



$$M_{23} = \frac{4}{L}EI\theta_2 + \frac{2EI}{L}\theta_3 = EI\theta_2 + 0.5EI\theta_3$$

$$M_{32} = \frac{4EI}{L}\theta_3 + \frac{2EI}{L}\theta_2 = EI\theta_3 + 0.5EI\theta_2$$



$$M_{34} = \frac{4EI}{L}\theta_3 + \frac{6EI}{L^2}\Delta_{34} = 2EI\theta_3 + 1.5EI\Delta_{34}$$

$$M_{43} = \frac{2EI}{L}\theta_3 + \frac{6EI}{L^2}\Delta_{34} = EI\theta_3 + 1.5EI\Delta_{34}$$

EDUCCIÓNS → A veuue opais B) aus ds tallaus inversos! → dms imel

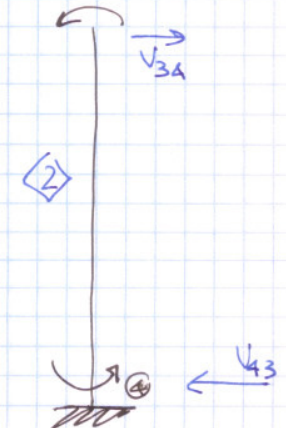


$$M_{21} + M_{23} = 0$$

$$M_{32} + M_{34} = 0$$

Adicional

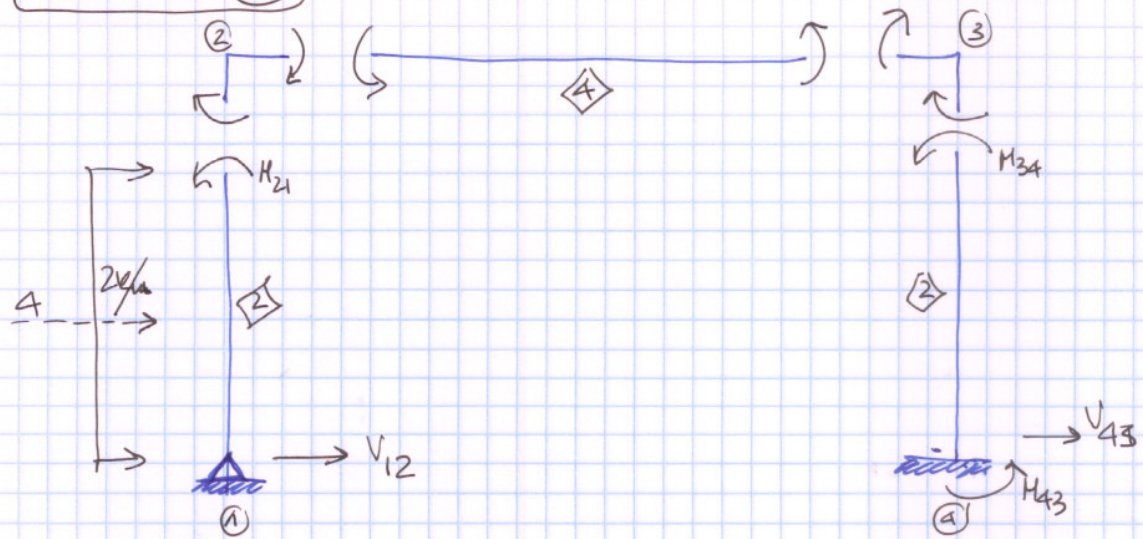
$$V_{12} + V_{43} = 4$$



$$\sum M_2: V_{12} \cdot 2 = 4 \cdot 1 + M_{21}$$

$$\sum M_3: V_{43} \cdot 2 = M_{32} + M_{34}$$

EQVACTIONS (B)



$$M_{21} + M_{23} = 0$$

$$M_{32} + M_{34} = 0$$

Additional

$$V_{12} + V_{43} + 4 = 0$$

$$\sum M_2 \quad V_{12} \cdot 2 + M_{21} + 4 \cdot 1 = 0$$

$$V_{12} = \frac{-M_{21} - 4}{2} = -0,5M_{21} - 2$$

$$\sum M_3 \quad V_{43} \cdot 2 + M_{34} + M_{43} = 0$$

$$V_{43} = -0,5M_{34} - 0,5M_{43}$$

$$① \quad M_{21} + M_{23} = 0$$

$$② \quad M_{32} + M_{34} = 0$$

$$③ \quad V_{12} + V_{43} = -4 \rightarrow -0,5M_{21} - 2 - 0,5M_{34} - 0,5M_{43} = -4 \rightarrow$$

$$0,5M_{21} + 0,5M_{34} + 0,5M_{43} = 2$$

MATEIXA FORMULA QUE EN EQVACTIONS (A) ! $\Rightarrow =$

$$\begin{cases} \textcircled{1} & M_{21} + M_{23} = 0 \\ \textcircled{2} & M_{32} + M_{34} = 0 \\ \textcircled{3} & V_{12} + V_{43} = 4 \end{cases} \rightarrow \cancel{2} + 0,5M_{21} + 0,5M_{32} + 0,5M_{43} = \cancel{4}$$

$$\begin{aligned} EI\theta_2 &= a & 14 \textcircled{2} \\ EI\theta_3 &= b \\ EI\Delta_{12} &= c \end{aligned}$$

$$\textcircled{1} \quad (-1 + 1,5EI\theta_2 + 0,75EI\Delta_{12}) + (EI\theta_2 + 0,5EI\theta_3) = 0$$

$$\boxed{-1 + 1,5a + 0,75c + a + 0,5b = 0}$$

$$\textcircled{2} \quad (EI\theta_3 + 0,5EI\theta_2) + (2EI\theta_3 + 1,5EI\Delta_{12}) = 0$$

$$\boxed{b + 0,5a + 2b + 1,5c = 0}$$

$$\textcircled{3} \quad [0,5(-1 + 1,5EI\theta_2 + 0,75EI\Delta_{12})] + [0,5(EI\theta_3 + 0,5EI\theta_2)] + [0,5(EI\theta_3 + 1,5EI\Delta_{12})] = 2$$

$$\boxed{-0,5 + 0,75a + 0,375c + 0,5b + 0,25a + 0,5b + 0,75c = 2}$$

$$\begin{aligned} \textcircled{1} & \cdot 2,5a + 0,5b + 0,75c = 1 \\ \textcircled{2} & \quad 0,5a + 3b + 1,5c = 0 \\ \textcircled{3} & \quad a + b + 1,125c = 2,5 \end{aligned}$$

$$\begin{aligned} a &= -0,5714 = EI\theta_2 \\ b &= -2,2857 = EI\theta_3 \\ c &= 4,7619 = EI\Delta_{12} \end{aligned}$$

$$M_{12} = 0$$

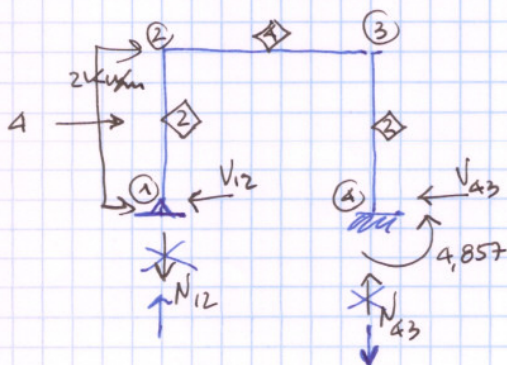
$$M_{21} = -1 + [1,5(-0,5714)] + [0,75 \cdot 4,7619] = 1,7143$$

$$M_{23} = -0,5714 + (0,5 \cdot [-2,2857]) = -1,71425 \quad \left. \begin{array}{l} \text{Equil./OK!} \end{array} \right\}$$

$$M_{32} = -2,2857 + [0,5 \cdot (-0,5714)] = -2,5714 \quad \left. \begin{array}{l} \text{Equil./OK!} \end{array} \right\}$$

$$M_{34} = [2 \cdot (-2,2857)] + [1,5 \cdot 4,7619] = 2,5714$$

$$M_{43} = -2,2857 + [1,5 \cdot 4,7619] = 4,8571$$



$$\sum M_4 = 0$$

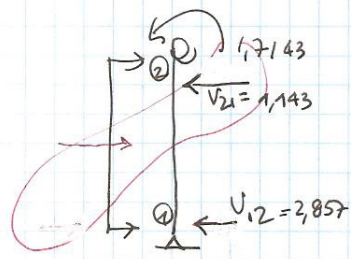
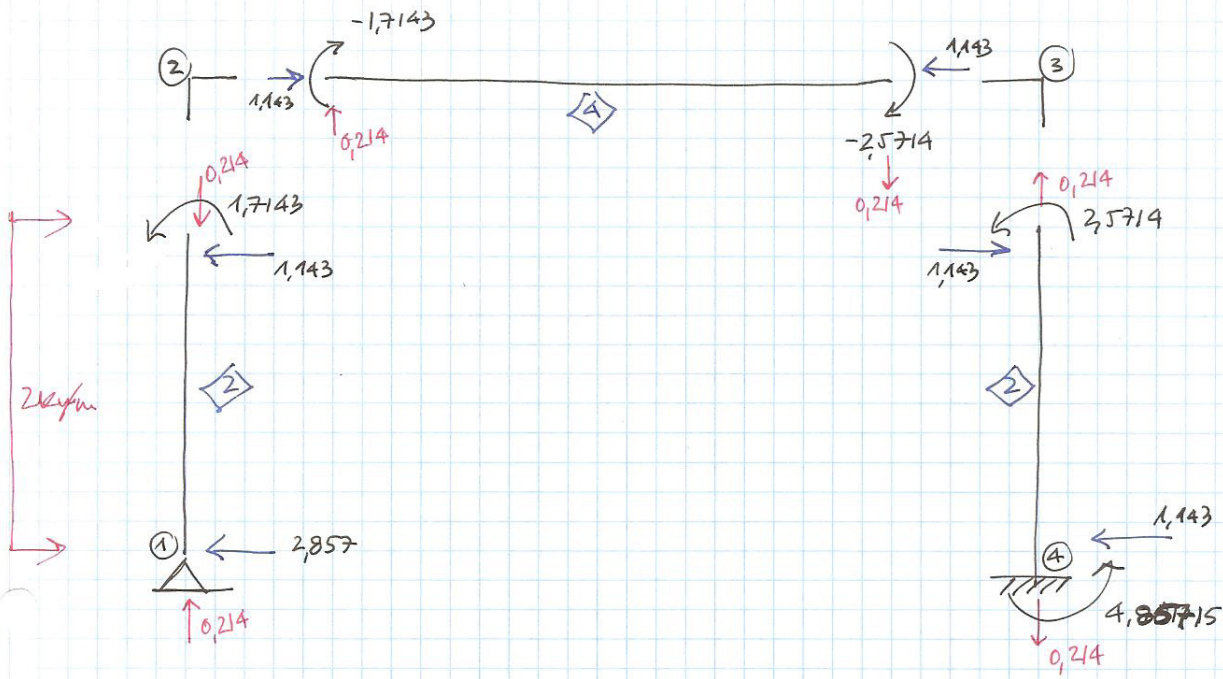
$$4 \cdot 1 = 4,857 + (N_{12} \cdot 4);$$

$$N_{12} = \frac{-0,857}{4} = -0,21425$$

TALLANTS. \Rightarrow

(I AXIS, \Rightarrow comencem per N_{12} i N_{43} en equilibri general estructura) EH_{4-30} la fine anterior

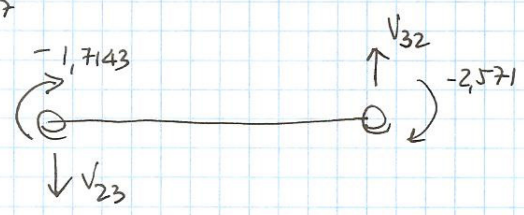
14-3



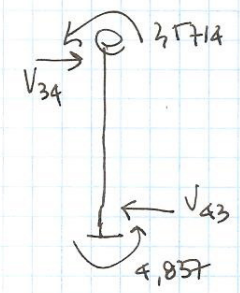
$$\sum M_2 = 0$$

$$2V_{12} = 1,7143 + (4 \cdot 1) \Rightarrow V_{12} = 2,857 \Rightarrow V_{21} = 4 - 2,857 = 1,143$$

(o també $\rightarrow V_{21} = \frac{(4 \cdot 1) - 1,714}{2} = 1,143$)



$$V_{23} = \frac{1,714 + 2,571}{4} = 1,071 = V_{32}$$



$$V_{43} = \frac{4,857 + 2,571}{2} = 3,714 = V_{34}$$

COMPROVACIÓ FINAL $\rightarrow \sum F_V = 0 \quad N_{12} + N_{43} = 0 \quad (OK!)$

$$\sum F_H = 0 \quad (2 \cdot 2) = 2,857 + 1,143 \quad (OK!)$$

$V_{12} + V_{43}$

$$\sum M_A = 0 \rightarrow (OK!)$$

14-3