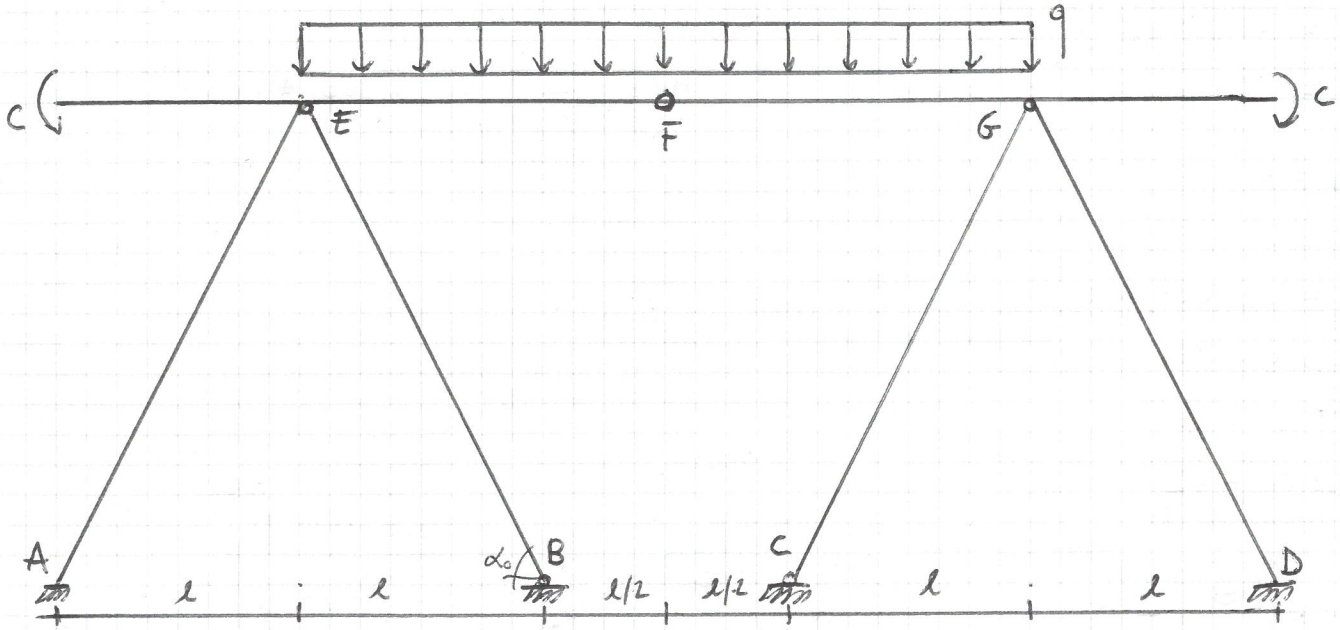
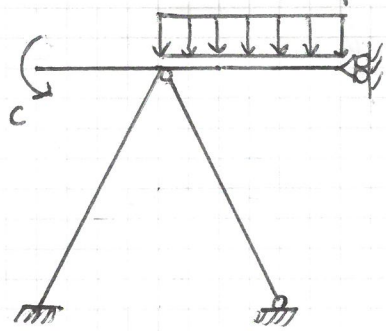
II PARZIALE FILA B

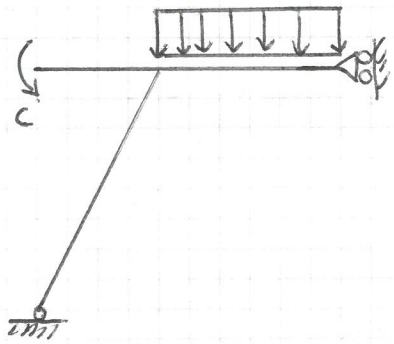


$L = 3\ m$ $\quad q = 3000\ N/m$ $\quad C = ql^2/2 = 13500\ N$

Struttura 2 volte iperstatica $\quad \alpha_0 = 63.43°$

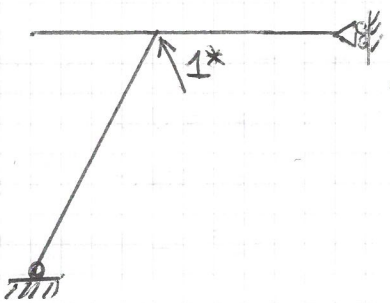


SISTEMA 0



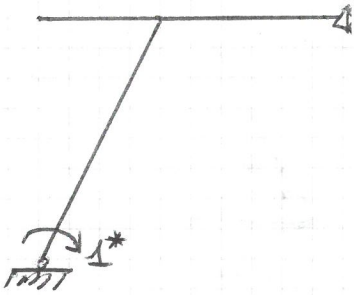
$+ X_1$

SISTEMA 1

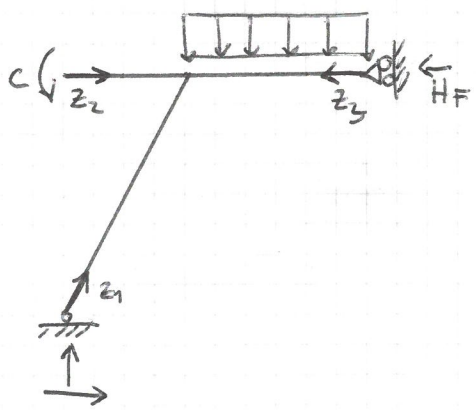


$+ X_2$

SISTEMA 2



SISTEMA 0



A↑ $\quad C - q\left(l+\frac{l}{2}\right)\left(\frac{(l+l/2)}{2}+l\right) - H_F \cdot 2l = 0$

$H_F = \frac{17}{16} ql = 9562.5\ N$

$H_F = H_A$

$V_A = 13500\ N$

$z_1 \rightarrow N = -H_A \cos\alpha - V_A \sin\alpha = -16351\ N$

$T = -H_A \sin\alpha - V_A \cos\alpha = -2515\ N$

$M = V_A \cos\alpha z - H_A \sin\alpha z \qquad M\left(z_1 = \frac{L}{\cos\alpha}\right) = 16863\ N\cdot m$

$z_2 \rightarrow N = 0$

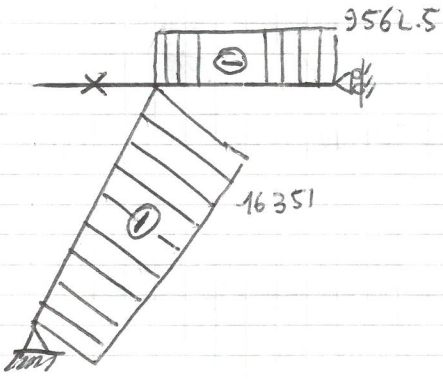
$T = 0$

$M = 13500\ N\cdot m$

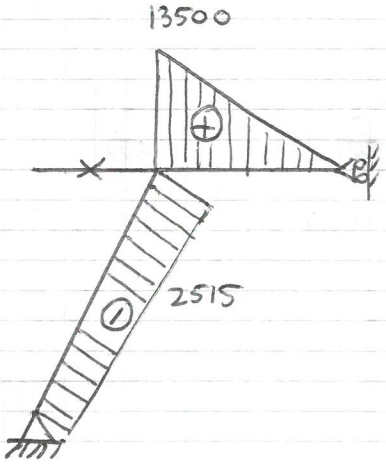
$z_3 \rightarrow N = -9562.5\ N$

$T = -qz$

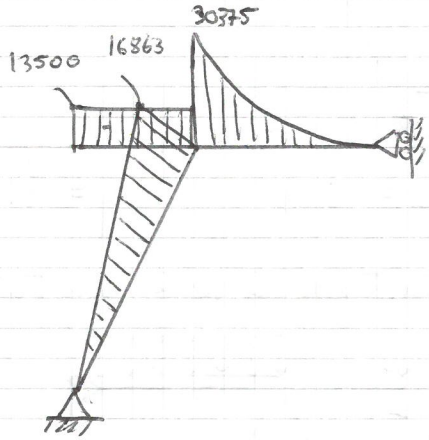
$M = -q\frac{z^2}{2}$



N [N]

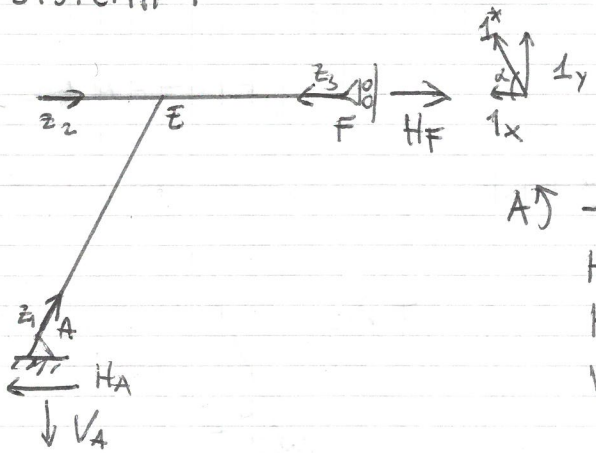


T [N]



M [N·m]

SISTEMA 1



$1_x = 1^* \cos\alpha = 0.45$

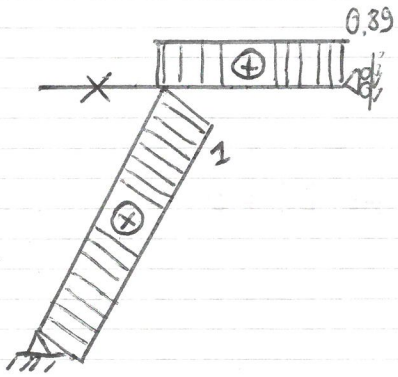
$1_y = 1^* \sin\alpha = 0.89$

$A\circlearrowleft \quad -H_F \cdot 2\ell + 1^* \cos\alpha \cdot 2\ell + 1^* \sin\alpha \cdot \ell = 0$

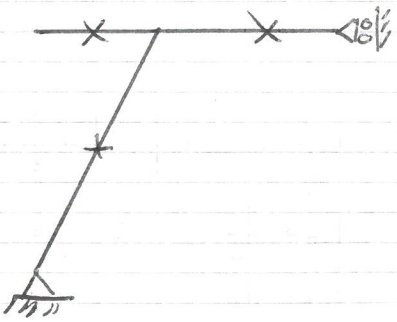
$H_F = 0.89$

$H_F = H_A - 1^* \cos\alpha$

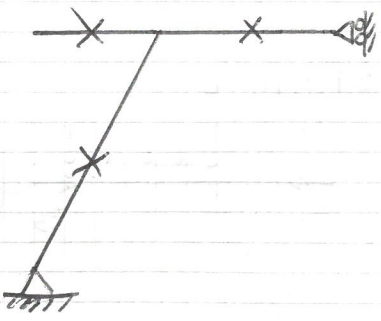
$V_A = 1^* \sin\alpha = 0.89$



N [N]

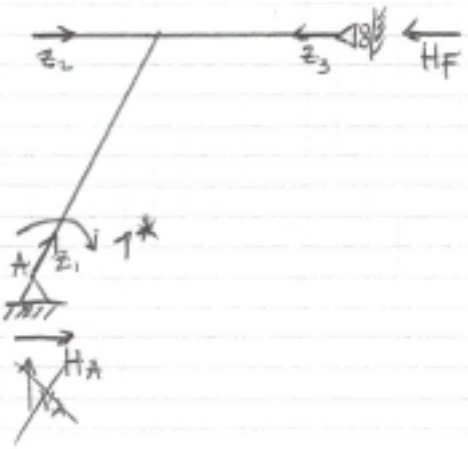


T [N]



M [N·m]

SISTEMA 2



$$A\circlearrowleft \quad -1 + H_F \cdot 2\ell = 0 \quad \rightarrow H_F = \frac{1}{2\ell} = \frac{1}{6}$$

$$H_F = H_A$$

$$V_A = 0$$

$z_1 \rightarrow$ $N(z_1) = -H_A \cos\alpha = 0.07\,N$

$T(z_1) = -H_A \sin\alpha = 0.14\,N$

$M(z_1) = 1 - H_A \sin\alpha\, z$

$z_2 \rightarrow$ $N(z_2) = 0$

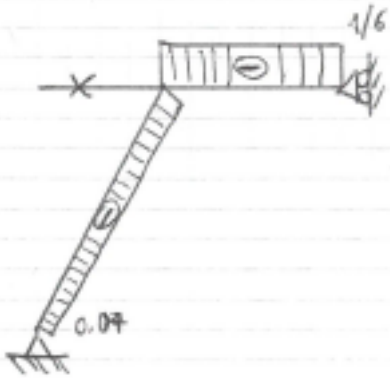
$T(z_2) = 0$

$M(z_2) = 0$

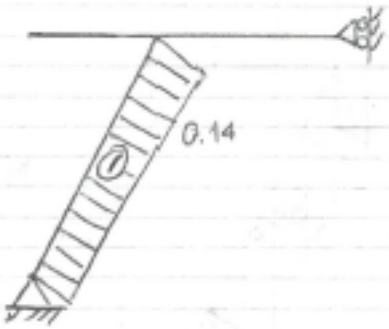
$z_3 \Rightarrow$ $N(z_3) = -1/6$

$T(z_3) = 0$

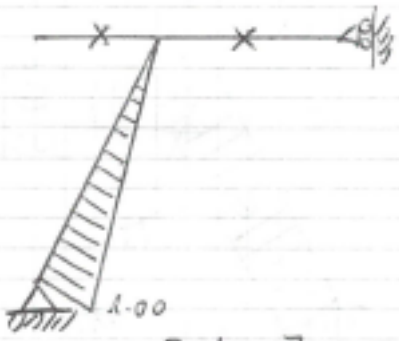
$M(z_3) = 0$



N [N]



T [N]



M [N·m]

$$\eta_{10} = 0$$

$$\eta_{20} = \frac{1}{EJ}\int_0^{3/\cos\alpha} (V_A \cos\alpha\, z - H_A \sin\alpha\, z)\left(1 - \frac{1}{6}\sin\alpha\, z\right) dz = -\frac{18355}{EJ}$$

$$\eta_{11} = 0$$

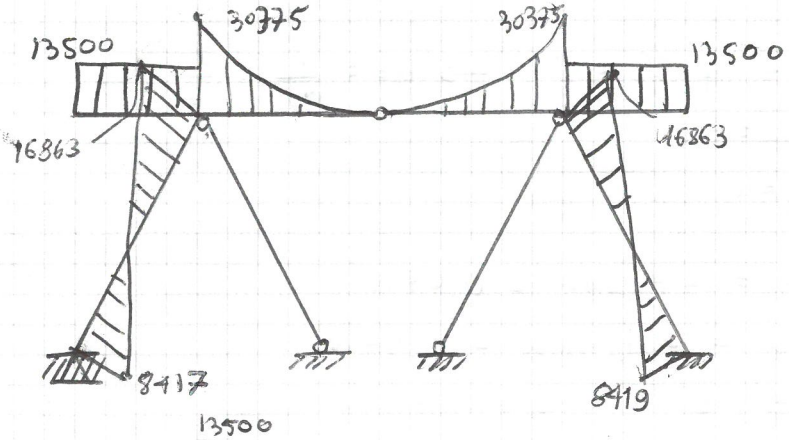
$$\eta_{22} = \frac{1}{EJ}\int_0^{3/\cos\alpha} \left(1 - \frac{1}{6}\sin\alpha\, z\right)^2 dz = \frac{2.24}{EJ}$$

$$\eta_{21} = 0$$

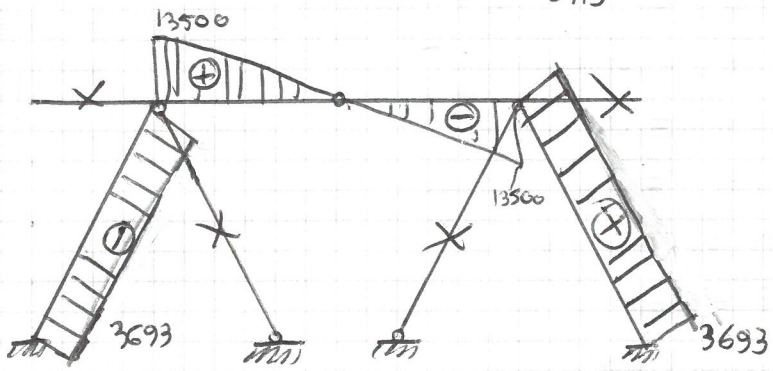
X_1 è noto a termine

$X_2 = 8417$ N·m

$$\begin{vmatrix} \eta_{11} & \eta_{21} \\ \eta_{21} & \eta_{22} \end{vmatrix} \begin{vmatrix} X_1 \\ X_2 \end{vmatrix} = \begin{vmatrix} -\eta_{10} \\ -\eta_{20} \end{vmatrix}$$


13500
30375
30375
13500
16863
16863
8417
8419

M[N/m]


13500
13500
3693
3693

T[N]

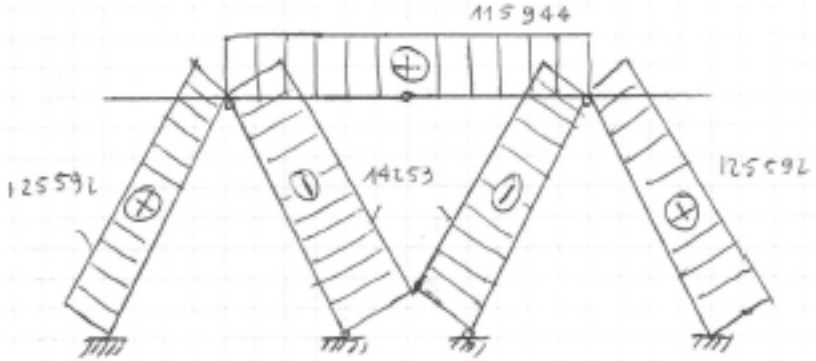
2) DEFORMABILITÀ ASSIALE BIELLA

$$\eta_{11}^{NEW} = \eta_{11}^{OLD} + \eta_{11}^{biella} = 0 + \int_0^{3/\cos\alpha} (-1)^2 / EA \, dz = \frac{6.707}{EA}$$

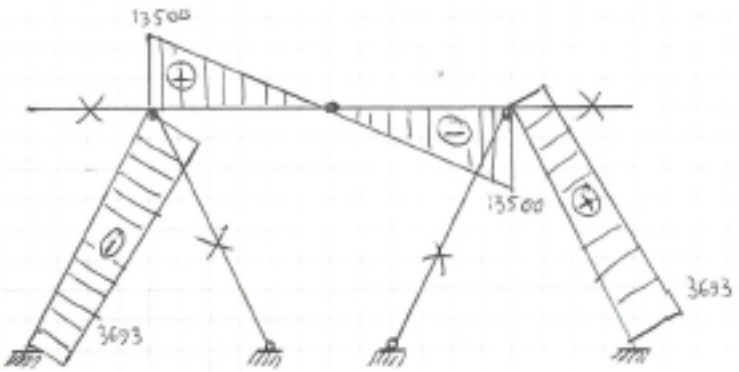
DEFORMABILITÀ

$$\begin{cases} \eta_{11}^{NEW} X_1 + \eta_{12} X_2 + \eta_{10} + \int_0^{3/\cos\alpha} (\alpha \Delta T (-1)) dz = 0 \\ \eta_{12} X_1 + \eta_{22} X_2 + \eta_{20} = 0 \end{cases}$$

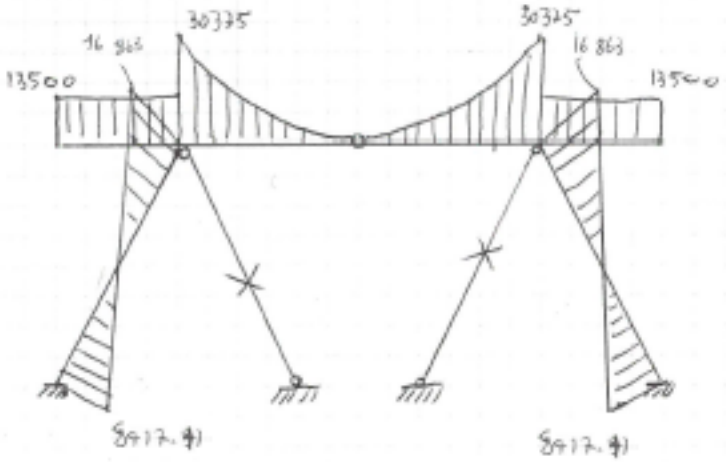
$$\begin{cases} X_1 = 14253 \ N \\ X_2 = 8417.41 \ N \cdot m \end{cases}$$



N [N]



T [N]



M [N m]