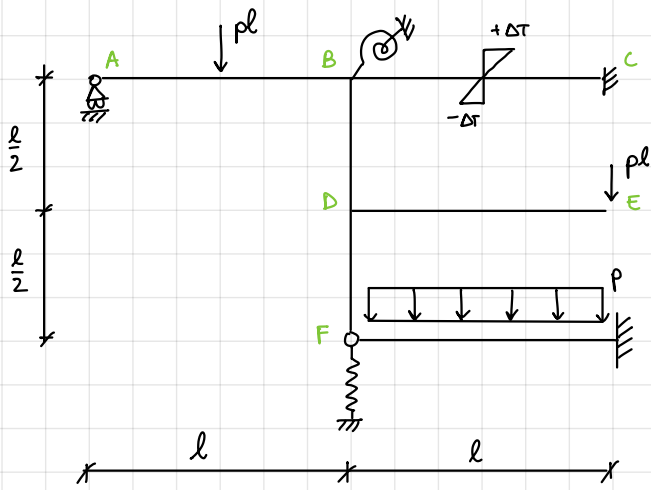
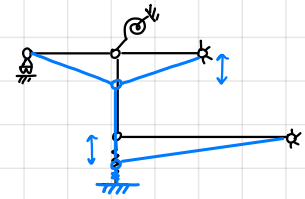


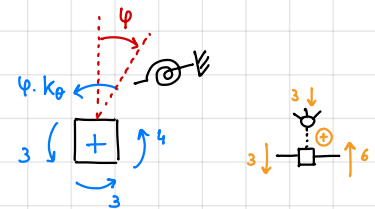
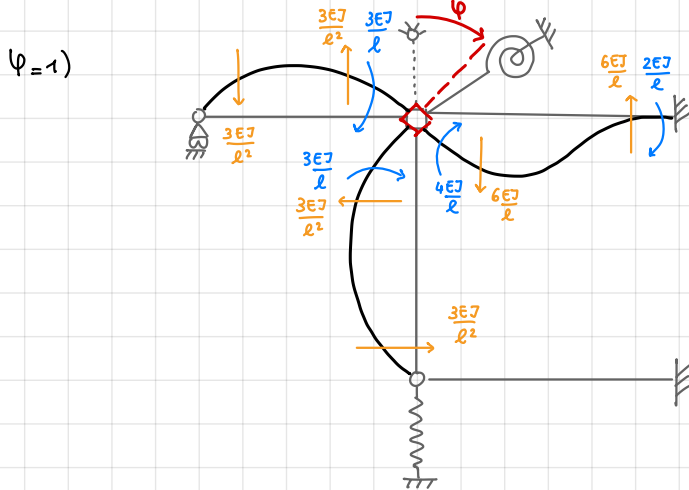
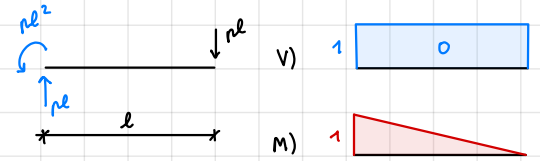


ANALISI CINEMATICA

CINEMATISMO

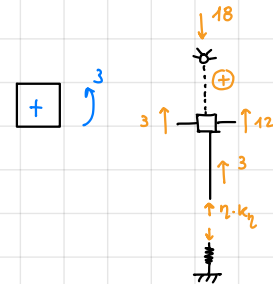
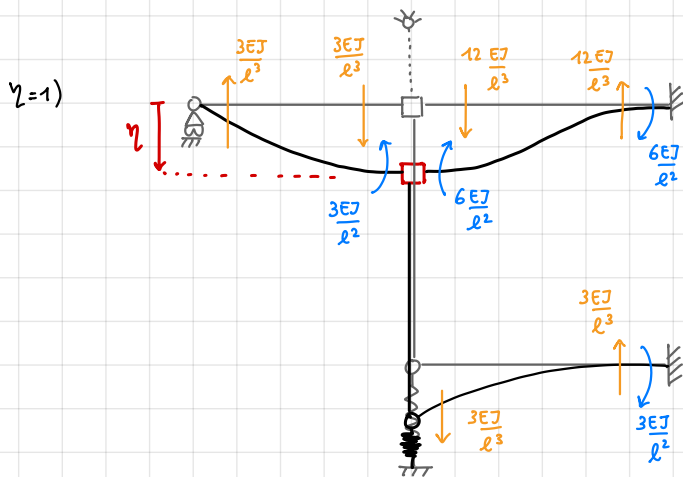


APPENDICE ISOSTATICA



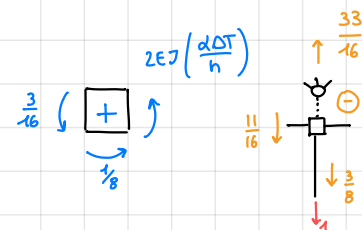
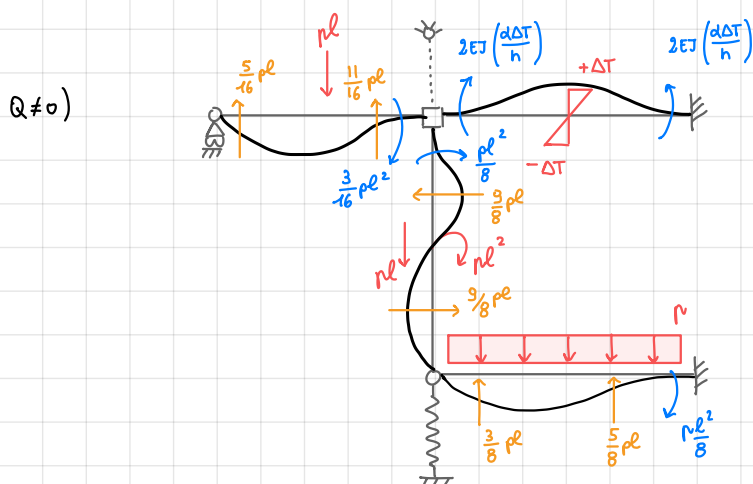
$$M_{B\varphi} = +10 \frac{EJ}{l} + \varphi \cdot k_t$$

$$h_{B\varphi} = +3 \frac{EJ}{l}$$



$$M_{B\eta} = 3 \frac{EJ}{l^2}$$

$$h_{B\eta} = 18 \frac{EJ}{l^3} + k_{\eta}$$



$$M_{B_0} = \frac{5}{16} pl^2 + 2EJ \left(\frac{\Delta T}{h} \right)$$

$$h_{B_0} = -\frac{17}{16} pl - pl = -\frac{33}{16} pl$$

$$K_\theta = 13 \frac{EJ}{l}$$

$$K_\eta = 36 \frac{EJ}{l^3}$$

$$\frac{\alpha \Delta T}{h} = \frac{1}{2} \frac{p l^2}{EJ}$$

$$(1) \quad \left\{ \begin{aligned} \psi_B \left(10 \frac{EJ}{l} + K_\theta \right) + \eta_B \left(3 \frac{EJ}{l^2} \right) + \left(\frac{5}{16} p l^2 + 2EJ \left(\frac{\alpha \Delta T}{h} \right) \right) &= 0 \end{aligned} \right.$$

$$(2) \quad \left\{ \begin{aligned} \psi_B \left(3 \frac{EJ}{l^2} \right) + \eta_B \left(18 \frac{EJ}{l^3} + K_\eta \right) - \frac{33}{16} p l &= 0 \end{aligned} \right.$$

$$(2) \quad \psi_B = \frac{l^2}{3EJ} \left(\frac{33}{16} p l - 54 \frac{EJ}{l^3} \eta_B \right)$$

$$= \frac{11}{16} \frac{p l^3}{EJ} - 18 \frac{1}{l} \eta_B$$

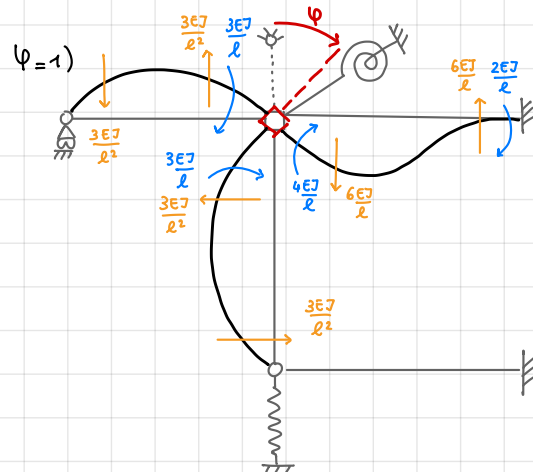
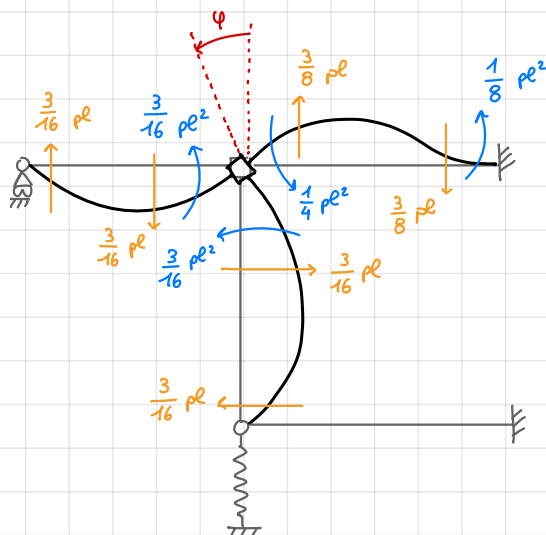
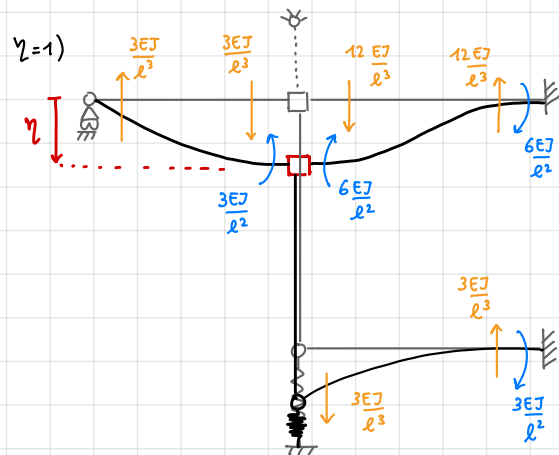
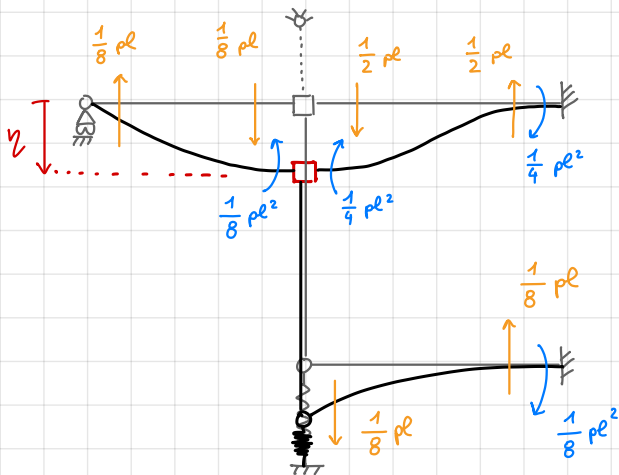
$$(1) \quad 23 \frac{EJ}{l} \left(\frac{11}{16} \frac{p l^3}{EJ} - 18 \frac{1}{l} \eta_B \right) + 3 \frac{EJ}{l^2} \eta_B + \frac{21}{16} p l^2 = 0$$

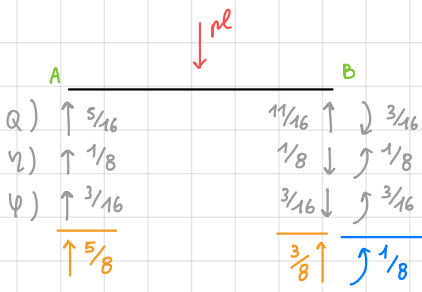
$$\frac{253}{16} p l^2 + \frac{21}{16} p l^2 = (414 - 3) \frac{EJ}{l^2} \eta_B$$

$$\frac{137}{8} \frac{1}{411} \frac{p l^4}{EJ} = \eta_B \Rightarrow \eta_B = \frac{1}{24} \frac{p l^4}{EJ} \rightarrow \text{Reazione MOLLA} = \frac{3}{2} p l \uparrow$$

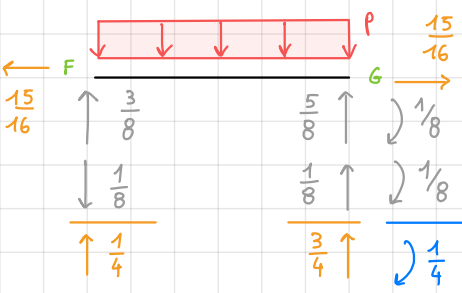
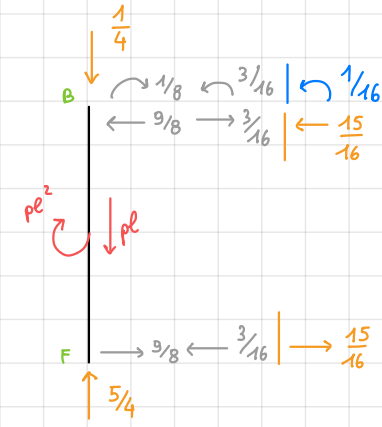
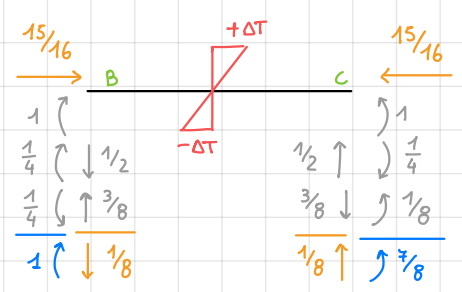
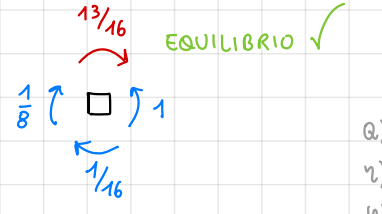
$$(2) \quad \psi_B = \frac{11}{16} \frac{p l^3}{EJ} - 18 \frac{1}{l} \eta_B$$

$$= \frac{33 - 36}{48} \frac{p l^3}{EJ} \Rightarrow \psi_B = - \frac{1}{16} \frac{p l^3}{EJ} \rightarrow \text{Reazione MOLLA} = - \frac{13}{16} p l^2$$



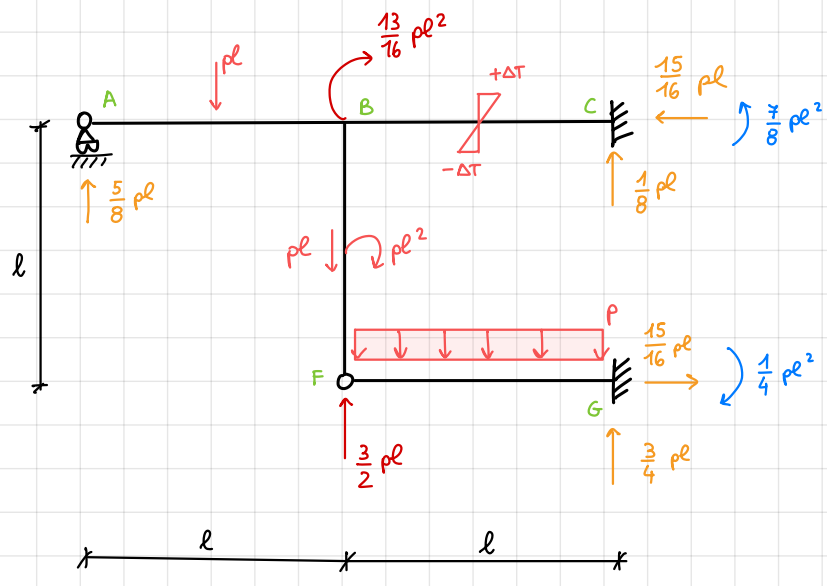


$\sum M(B) = 0 \quad (\curvearrowright +)$
 $\frac{7}{8} p l^2 - p \frac{l^2}{2} - \frac{3}{8} p l^2 = 0 \quad \checkmark$



$\sum M(G) = 0 \quad (\curvearrowright +)$
 $\frac{1}{4} p l^2 - p \frac{l^2}{2} + \frac{1}{4} p l^2 = 0 \quad \checkmark$

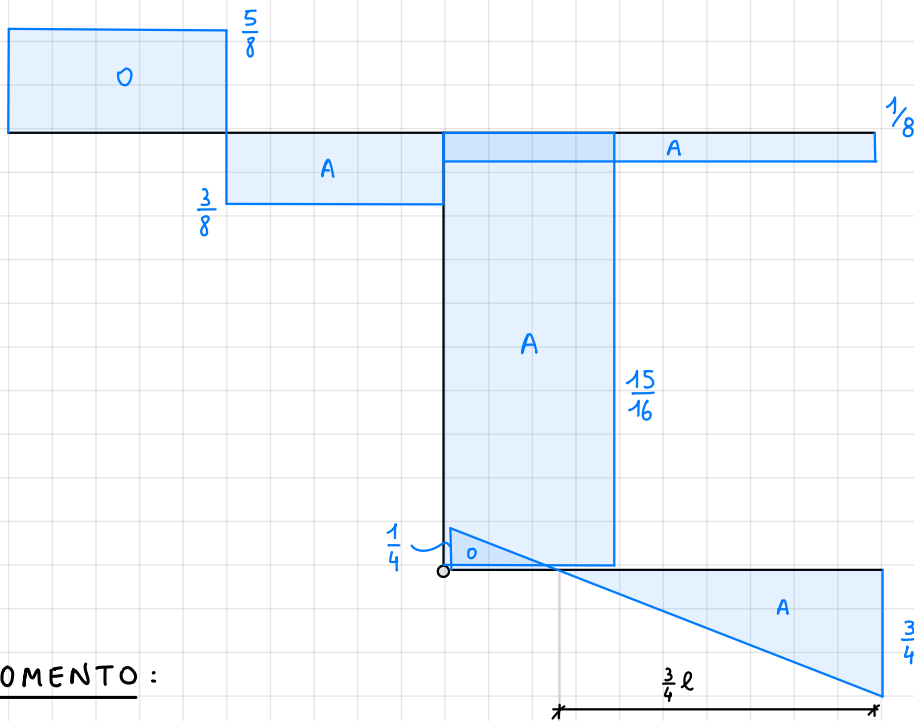
VERIFICA EQUILIBRIO GLOBALE



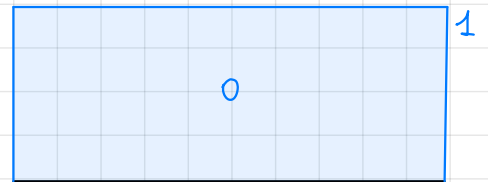
$\sum V = 0$
 $(\frac{5}{8} + \frac{1}{8} + \frac{3}{2} + \frac{3}{4}) p l - 3 p l = 0 \quad \checkmark$

$\sum M(G) = 0 \quad (\curvearrowright +)$
 $\frac{5}{8} p l \cdot 2l - p l \cdot \frac{3}{2} l + \frac{13}{16} p l^2 - \frac{15}{16} p l \cdot l - \frac{7}{8} p l^2 + p l^2 - p l \cdot l + \frac{3}{2} p l \cdot l - p l \cdot \frac{l}{2} + \frac{1}{4} p l^2 = 0$
 $(\frac{5}{4} + \frac{13}{16} - \frac{15}{16} - \frac{7}{8} - \frac{1}{2} + \frac{1}{4}) p l^2 = 0$
 $1 - 1 = 0 \quad \checkmark$

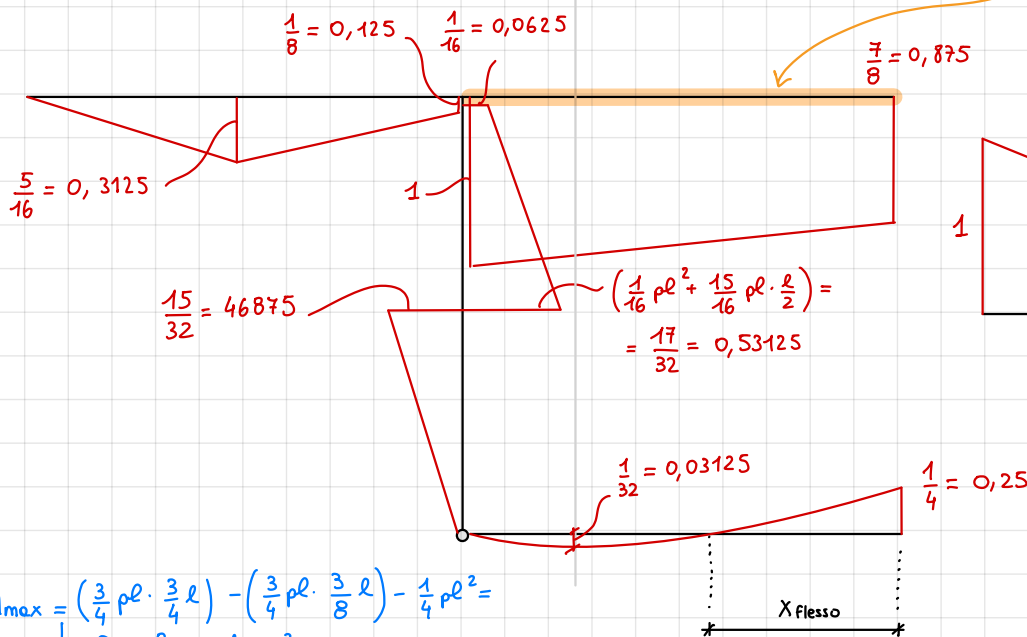
TAGLIO :



Appendice
isostatica:



MOMENTO :

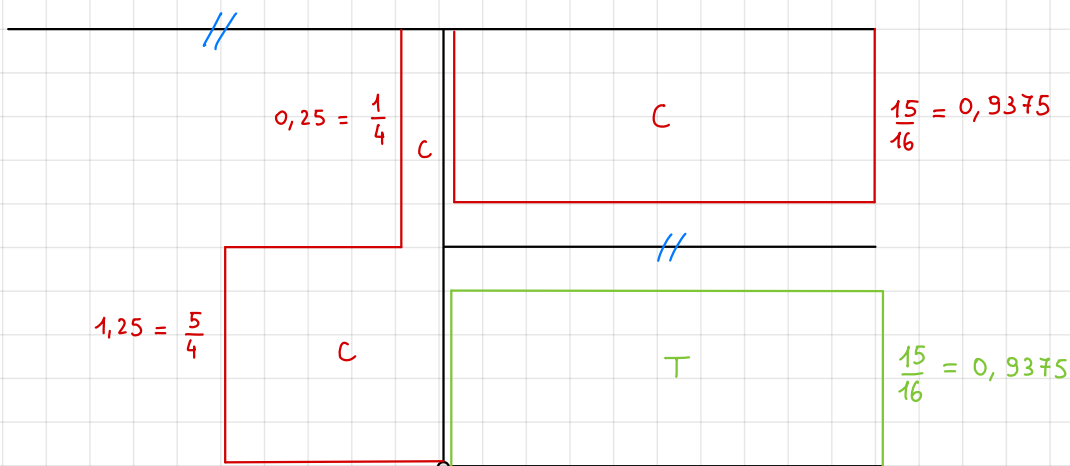


volutore le fibre tese
ed eventuali flessi
legati al conico termico

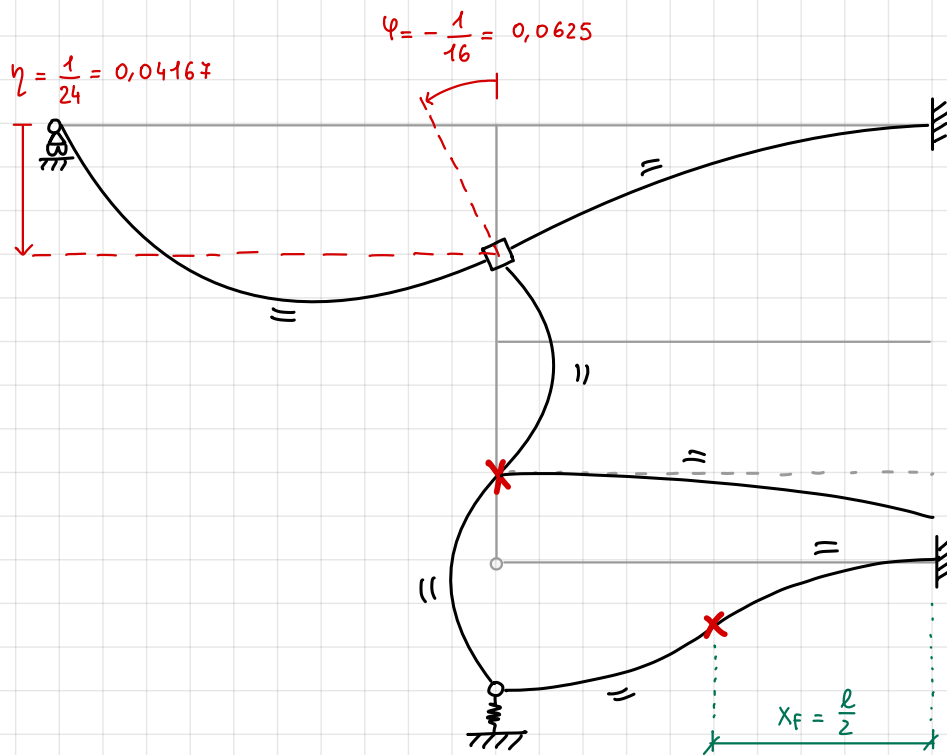
Appendice
isostatica:



AZIONE ASSIALE :



DEFORMATA QUALITATIVA :



1) variazione della curvatura in presenza di carico termico:

$M(x) = -\frac{7}{8} p l^2 + \frac{1}{8} p l x$

$y''(x) = -\frac{M(x)}{EJ} + 2 \frac{\alpha \Delta T}{h}$

$M(x) = -\frac{7}{8} p l^2 + \frac{1}{8} p l x$

$y''(x) = \frac{1}{8} \frac{p l^2}{EJ} - \frac{7}{8} \frac{p l x}{EJ} + \frac{p l^2}{EJ}$

$\frac{9}{8} \frac{p l^2}{EJ} - \frac{7}{8} \frac{p l}{EJ} x > 0$

$\forall x < \frac{9}{7} l \cdot \frac{8}{7} \longrightarrow y''(x) > 0 \quad \forall x < \frac{9}{7} l$

2) posizione flessa ante FG:

$M(x) = \frac{1}{4} p l^2 - \frac{3}{4} p l x + p \frac{x^2}{2} = 0$

$2x^2 - 3 p l x + p l^2 = 0$

$x_{1,2} = \frac{3 \pm \sqrt{9 - 8}}{4} = \frac{3 \pm 1}{4} = \frac{1 l}{2}$