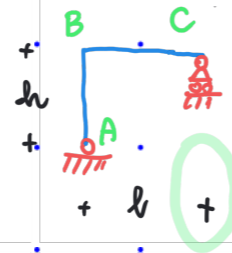


Il problema cinematico (1 corpo rigido)

ESEMPIO



• polo (arbitrario)

$$\begin{cases} u = u_A - \vartheta y \\ v = v_A + \vartheta x \end{cases}$$

$$\underline{q} = [u_A \ v_A \ \vartheta]^T \leftarrow$$

• SISTEMA LINEARE

$$\begin{cases} u_A = 0 \\ v_A = 0 \end{cases}$$

$$\rightarrow v_A + \vartheta l = 0$$

$$\underline{A} \underline{q} = \underline{0}$$

FORMA MATRICIALE

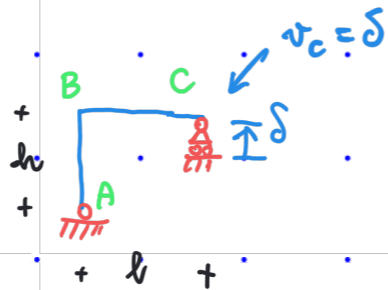
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & l \end{bmatrix} \begin{bmatrix} u_A \\ v_A \\ \vartheta \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\det \underline{A} \neq 0$$

⇒ Unicità della soluzione

$$\underline{q} = \underline{0}$$

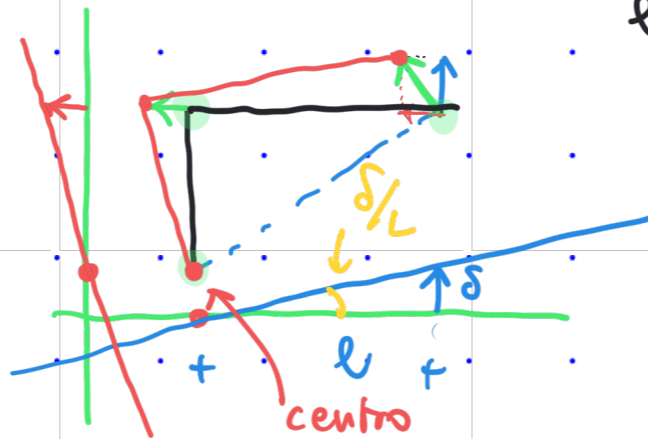
Condimenti:



$$\delta \cdot \omega \cdot v_A + \vartheta l = \delta \quad (= v_C)$$

$$\underline{A} \underline{q} = \begin{bmatrix} 0 \\ 0 \\ \delta \end{bmatrix}$$

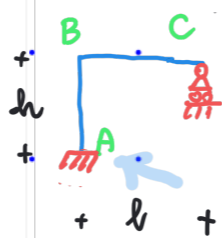
$$\vartheta = \frac{\delta - v_A}{l} = \frac{\delta}{l}$$



punti significativi deformati

Il problema cinematico (1 corpo rigido)

ESEMPIO 2 Sistema IPOCINEMATICO



$$\begin{cases} u = u_A - \delta y \\ v = v_A + \delta x \end{cases}$$

$$\underline{q} = [u_A \ v_A \ \delta]^T$$

FORMA MATRICIALE

• SISTEMA LINEARE

$$\begin{cases} u_A = 0 \\ v_A = 0 \\ \delta = 0 \\ v_A + \delta l = 0 \end{cases}$$

n colonne

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & l \end{bmatrix} \begin{bmatrix} u_A \\ v_A \\ \delta \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ \delta \end{bmatrix} \quad 4 \text{ eq.}^n$$

$$\underline{A} \underline{q} = \underline{0}$$

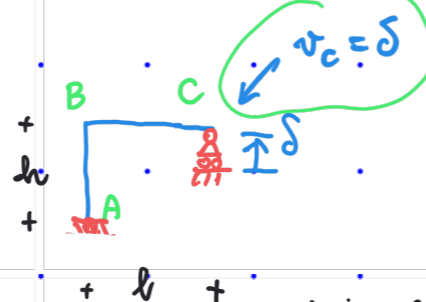
$$p = 3$$

⇒ Unicità della soluzione

$$\underline{q} = \underline{0}$$

$$\infty^{n-p} = \infty^0 = 1$$

Cedimenti:



$$4^a \text{ eq.} \quad v_A + \delta l = \delta$$

$$(\delta = v_C)$$

$$\underline{A} \underline{q} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ \delta \end{bmatrix}$$

prime 3 eq.ⁿ ⇒ q = 0
la 4^a diventa 0 = delta

non esiste soluzione!

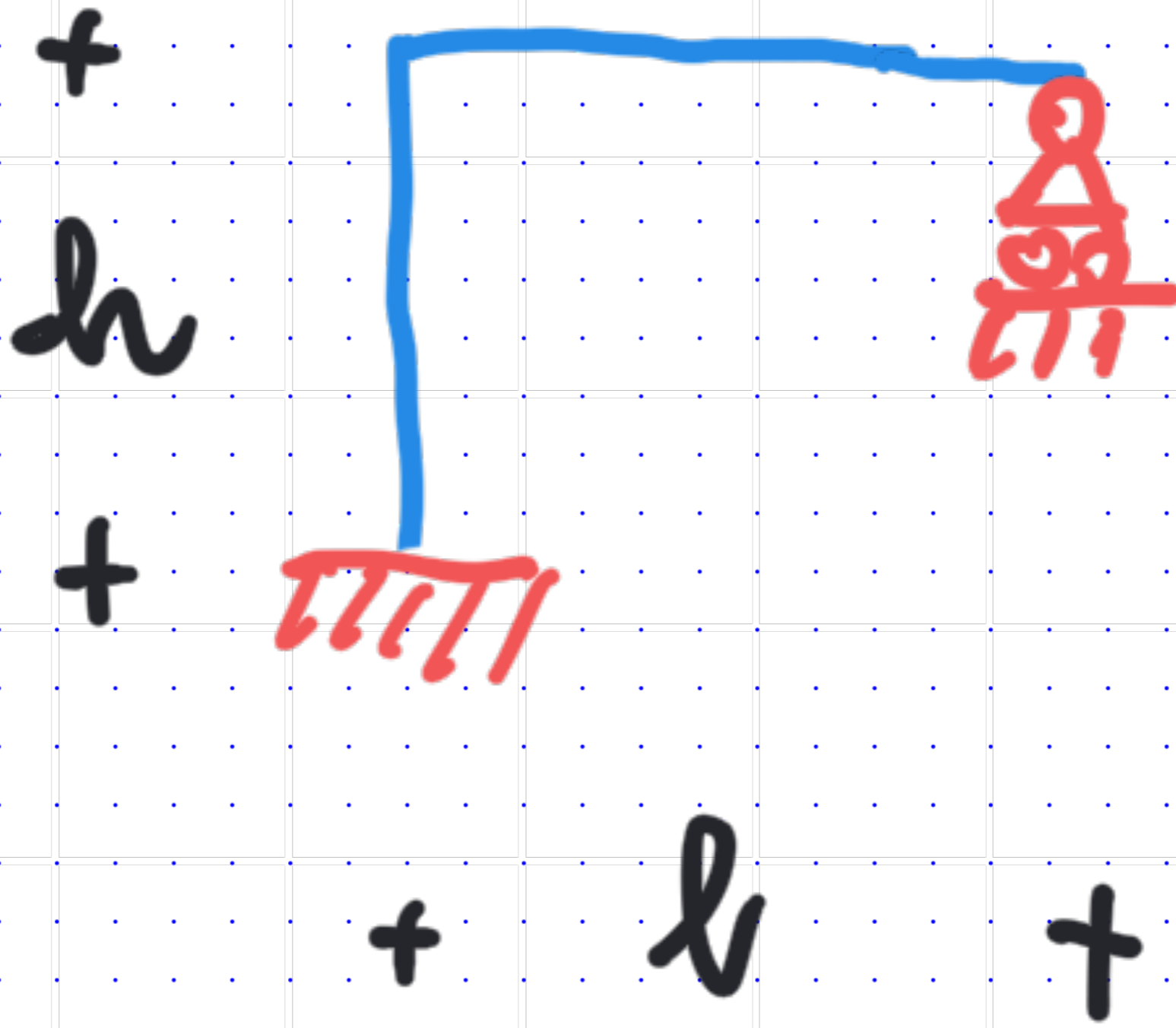
$$q = 0$$



Per assegnazioni particolari di cedimenti esiste sol



ESEMPIO 2



Il problema cinematico (1 corpo rigido)

DATI:

- corpo rigido \mathcal{C} (config. iniziale)
- m vincoli semplici
- m ceppi

INCOGNITE: