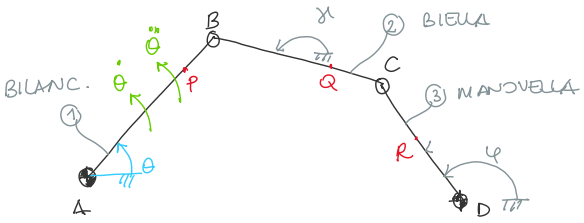
Eserc: Quadrilatero Articolato

venerdì 22 novembre 2024 11:39



Noto: geometria configurata nell'atto di moto $\bar{t}=\bar{b}$

$\Rightarrow \theta(\bar{t}),\ \dot\theta(\bar{t}),\ \ddot\theta(\bar{t})$

$\Rightarrow \gamma(\bar{t})$ e $\varphi(\bar{t})$

θ positivo antiorario $(\dot\theta>0,\ \ddot\theta>0)$

Trovare: 1) VELOC.
2) Cv
3) ACCEL.

VELOCITÀ

$$\underline{v}_B = \underline{v}_A + \underline{\omega}\wedge\overrightarrow{AB} \quad \text{FFC}$$

$$\underline{v}_{P①} = \underline{\omega}\wedge\overrightarrow{AP} = \dot\theta\,\underline{k}\wedge\overrightarrow{AP} \quad (\checkmark)$$

$$\underline{v}_{Q②} = \underline{v}_B + \underline{\omega}_2\wedge\overrightarrow{BQ} = \underline{\omega}\wedge\overrightarrow{AB} + \dot\gamma\,\underline{k}\wedge\overrightarrow{BQ} = \dot\theta\,\underline{k}\wedge\overrightarrow{AB} + \dot\gamma\,\underline{k}\wedge\overrightarrow{BQ}$$

INCOGNITA $\dot\gamma$?

$$\underline{v}_{B①} = \underline{v}_{B②}$$

$$\underline{v}_{R③} = \underline{v}_C + \dot\varphi\,\underline{k}\wedge\overrightarrow{CR} = \dot\theta\,\underline{k}\wedge\overrightarrow{AB} + \dot\gamma\,\underline{k}\wedge\overrightarrow{BC} + \dot\varphi\,\underline{k}\wedge\overrightarrow{CR}$$

INC. $\dot\varphi$ (*)

$$\underline{v}_{C②} = \underline{v}_{C③}$$

$$\underline{v}_{D③} = \underline{0} \longrightarrow \dot\theta\,\underline{k}\wedge\overrightarrow{AB} + \dot\gamma\,\underline{k}\wedge\overrightarrow{BC} + \dot\varphi\,\underline{k}\wedge\overrightarrow{CD} = \underline{0} \quad (1)$$

TR_2_1

$$\underline{v}_{R③} = \underline{v}_D^{\,0} + \dot\varphi\,\underline{k}\wedge\overrightarrow{DR}$$

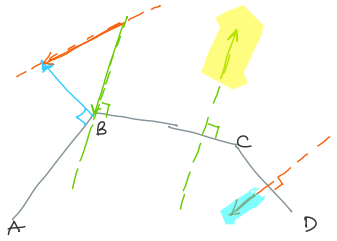
INC. $\dot\varphi$

$$\underline{v}_{C②} = \underline{v}_{C③} \longrightarrow \dot\theta\,\underline{k}\wedge\overrightarrow{AB} + \dot\gamma\,\underline{k}\wedge\overrightarrow{BC} = \dot\varphi\,\underline{k}\wedge\overrightarrow{DC} \quad (2)$$

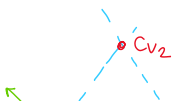
TR TR

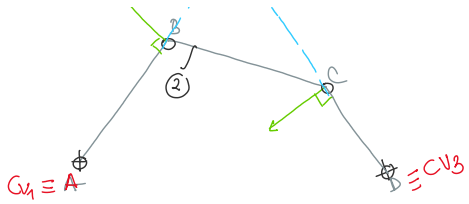
① noto ② noto dir ③ noto dir

$$\begin{cases}\dot\gamma<0\\ \dot\varphi>0\end{cases}$$

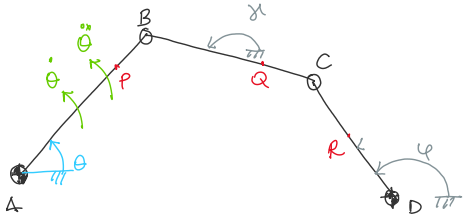


Cv





ACCELERAZIONI



$$\underline{a}_{P\textcircled{1}} = \dot{\underline{\omega}} \wedge \overrightarrow{AP} - \omega^2 \overrightarrow{AP} \;\Big|\; = \ddot{\theta}\,\underline{k} \wedge \overrightarrow{AP} - \dot{\theta}^2 \overrightarrow{AP}$$

$$\underline{a}_{Q\textcircled{2}} = \underline{a}_B + \dot{\underline{\omega}}_2 \wedge \overrightarrow{BQ} - \omega_2^2 \overrightarrow{BQ} \;\Big|\; = \ddot{\theta}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\theta}^2 \overrightarrow{AB}$$

$$= \ddot{\theta}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\theta}^2 \overrightarrow{AB} + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{BQ} - \dot{\gamma}^2 \overrightarrow{BQ} \qquad \ddot{\gamma}\,?$$

$$\underline{a}_{R\textcircled{3}} = \cancel{\underline{a}_B}^{\,0} + \dot{\underline{\omega}}_3 \wedge \overrightarrow{DR} - \omega_3^2 \overrightarrow{DR} \;\Big|\; = \ddot{\varphi}\,\underline{k} \wedge \overrightarrow{DR} - \dot{\varphi}^2 \overrightarrow{DR} \qquad \ddot{\varphi}\,?$$

$$\rightarrow \boxed{\underline{a}_B = \underline{a}_A + \dot{\underline{\omega}} \wedge \overrightarrow{AB} - \omega^2 \overrightarrow{AB}} \leftarrow$$

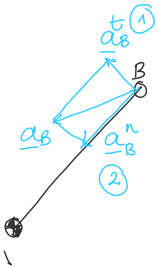
P

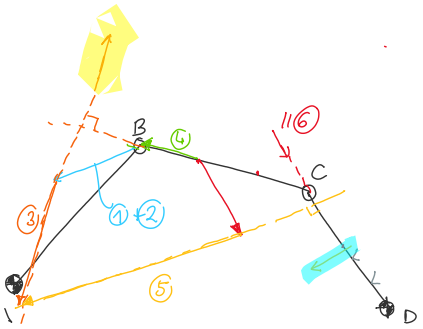
$$\boxed{\underline{a}_{C_2} = \underline{a}_{C_3}} \quad \begin{matrix} \text{TR} \\ \text{TR} \end{matrix} \qquad \ddot{\varphi}\,? \quad \ddot{\gamma}\,?$$

$$\ddot{\theta}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\theta}^2 \overrightarrow{AB} + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{BC} - \dot{\gamma}^2 \overrightarrow{BC} = \ddot{\varphi}\,\underline{k} \wedge \overrightarrow{DC} - \dot{\varphi}^2 \overrightarrow{DC}$$

noto	noto	noto dir.	noto	noto dir.	noto
①	②	③	④	⑤	⑥

Hp noto intensità ①e② ④, ⑥





$$\begin{cases} \ddot{\gamma} < 0 \\ \ddot{\varphi} > 0 \end{cases}$$

①+②