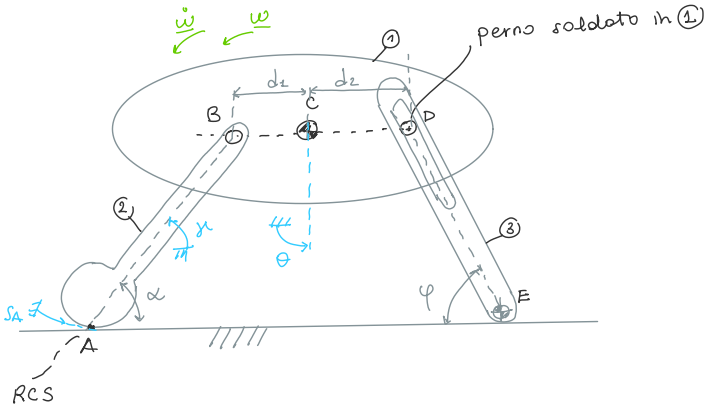
Eserc: RCS e Perno in asola

venerdì 29 novembre 2024 11:34



Noto: geometria

$\dot\theta$, $\ddot\theta$

Valutare: 1) tipo di ROTOL. in C per avere 1 gdl

2) tipo moto assoluto e relativo tra (1 e 2) e (1 e 3)

3) $\underline{v}$ < soluz. grafica / soluz. analit./geom.

4) $\underline{a}$ Assoluti

5) $\underline{a}$

1) $n_{gdl} = 3 \times 3 - 3 \times 2 - 1 \times 1 - X = 1$

3 × 3: A

3 × 2: CERN. B, C, E

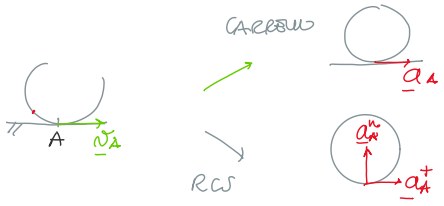
1 × 1: CARRELLO D ∥ PERNO IN ASOLA

X = 1 ⇒ RCS

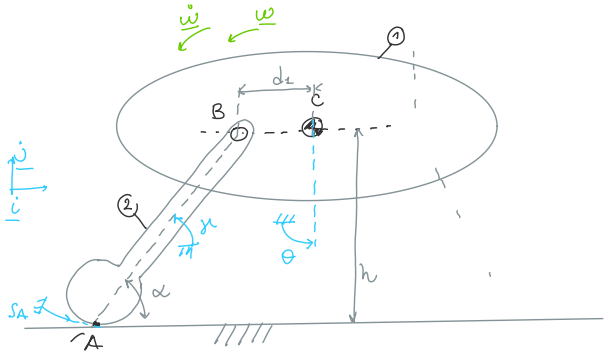
2) ① ROT ① ② ROT

③ ROT ① ③ ROT - TRAS

② ROT TRAS



3) VEL. ① ②



VELOCITÀ DI STRISCIAMENTO

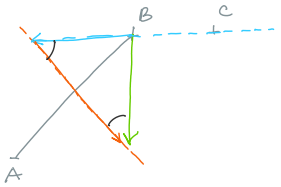
$\underline{v}_{B②} = \underline{v}_{B①}$ (PFC / FFC)

$\underline{v}_{B②} = \underline{v}_A + \dot\gamma \underline{k} \wedge \overrightarrow{AB} = \dot s_A \underline{i} + \dot\gamma \underline{k} \wedge \overrightarrow{AB}$

$\dot s_A \underline{i} + \dot\gamma \underline{k} \wedge \overrightarrow{AB} = \dot\theta \underline{k} \wedge \overrightarrow{CB}$ ∥ Eq^ne CHIUSURA

$\dot s_A$: noto dir. ? ① — $\dot\gamma$: ? noto dir ② — $\dot\theta$: noto ③

SOLUZ. GRAFICA



$\begin{cases} \dot s_A < 0 \\ \dot\gamma < 0 \end{cases}$

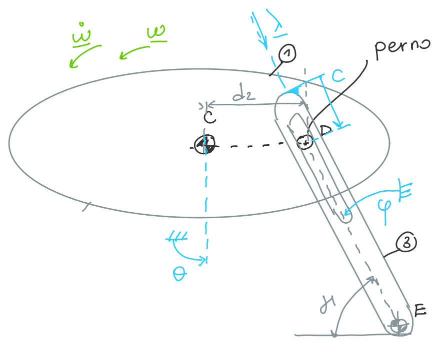
SOLUZ. ANAL.

$\dot{s}_A \underline{i} + \dot{\gamma} \left(\overrightarrow{\ h\ } \right) = -\dot{\theta} d_1 \underline{j}$

$$\begin{cases} x: & \dot{s}_A - h\dot{\gamma} = 0 \\ y: & +\dot{\gamma} h = -\dot{\theta} d_1 \end{cases}$$

$$\begin{cases} \dot{s}_A = h\dot{\gamma} = -\dot{\theta} d_1 < 0 \\ \dot{\gamma} = -\dot{\theta} \dfrac{d_1}{h} < 0 \end{cases}$$

PROBLEMA v ①-③



$\boxed{v_{D③} = v_{D①}}$

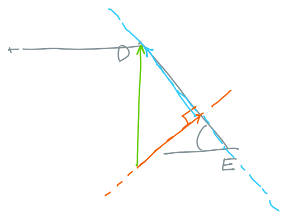
FFC — TCV $\Sigma_③$

$\Sigma_③ \quad v^{ass}_{D①} = v^{rel}_D + v^{tr}_D$ ($v_{D③}$)

$= \dot{c}\,\underline{\lambda} + \dot{\varphi}\,\underline{k} \wedge \overrightarrow{ED}$

$\| \ \dot{\theta}\underline{k} \wedge \overrightarrow{CD} = \dot{c}\,\underline{\lambda} + \dot{\varphi}\,\underline{k} \wedge \overrightarrow{ED} \ \|$

① noto — ② ? — ③ ?



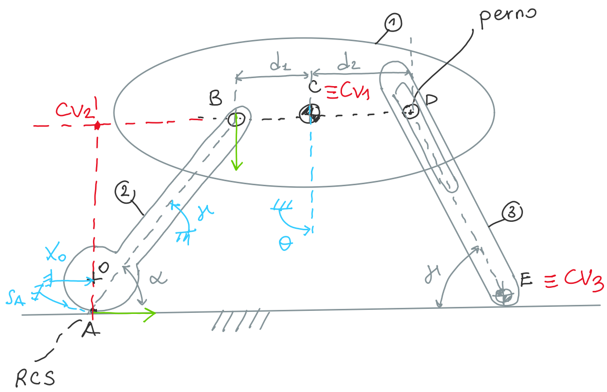
$$\begin{cases} \dot{c} < 0 \\ \dot{\varphi} < 0 \end{cases}$$

CR ASSOLUTI

CR_1

CR_2

CR_3



PROBLEMA ACCELERAZ. ①-②

$\boxed{a_{B②} = a_{B②}}$ $\Rightarrow$ 2 EQ^{NI} SCALARI VS 3 INCOGNITE

$a_{B①}$ — TR; TR (A) $\longrightarrow$ $a_B = a_A + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\gamma}^2 \overrightarrow{AB} = \ddot{s}_A \underline{i} + \dfrac{\dot{s}_A^2}{\rho_A} \underline{j} + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\gamma}^2 \overrightarrow{AB}$

$a_{A②} = \ddot{s}_A \underline{i} + \dfrac{\dot{s}_A^2}{\rho_A} \underline{j}$

$\boxed{a_{B②} = a_{B②}}$

$a_{B①}$ — TR $\longrightarrow$ $a_{..} = a_O + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{AB} - \dot{\gamma}^2 \overrightarrow{AB}$

(10)

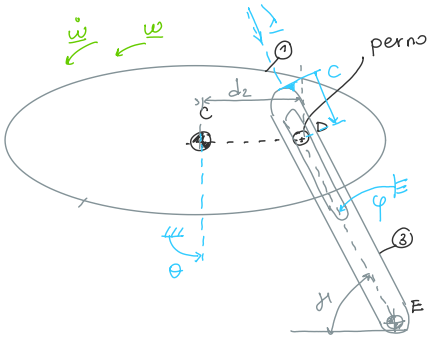
$$\underline{a}_B = \ddot{x}_B \underline{\imath}$$

$$\ddot{\theta}\,\underline{k} \wedge \overrightarrow{CB} - \dot{\theta}^2 \overrightarrow{CB} = \ddot{x}_B \underline{\imath} + \ddot{y}\,\underline{k} \wedge \overrightarrow{AB} - \dot{y}^2 \overrightarrow{AB}$$

PROBLEMA ACCELERAZ. ① - ③

$$\underline{a}_{D\,①} = \underline{a}_{O\,①}$$

TR — TCA - Σ③



Σ③

$$\underline{a}_{D\,①}^{ass} = \underline{a}_O^{rel} + \underline{a}_D^{tr} + \underline{a}_D^{cor}$$

$\underline{a}_O^{rel} = \ddot{c}\,\underline{\lambda}$

$\underline{a}_D^{tr}$ = $\underline{a}_{D\,③}$ TR.

$\underline{a}_D^{cor} = 2\,\underline{\omega}^{tr} \wedge \underline{v}^{rel}$, $\underline{\omega}_3 = \dot{\gamma}\,\underline{k}$, $\underline{v}^{rel} = \dot{c}\,\underline{\lambda}$

$$\ddot{\theta}\,\underline{k} \wedge \overrightarrow{CD} - \dot{\theta}^2 \overrightarrow{CD} = \ddot{c}\,\underline{\lambda} + \ddot{\gamma}\,\underline{k} \wedge \overrightarrow{ED} - \dot{\gamma}^2 \overrightarrow{ED} + 2\dot{\gamma}\,\underline{k} \wedge \dot{c}\,\underline{\lambda}$$

? !