td CIN 1.00 (prof 25 min → 50 min) (7h55)

① $\boxed{\begin{aligned} \vec{AB} &= -L\,\vec{y_1} \\ \vec{BC} &= -L\,\vec{y_2} \\ \vec{CD} &= L\,\vec{x_3} \end{aligned}}$

② Chasles $\vec{AD} = \vec{AB} + \vec{BC} + \vec{CD}$

$$\boxed{\vec{AD} = -L\vec{y_1} - L\vec{y_2} + L\vec{x_3}}$$ 7h57

③

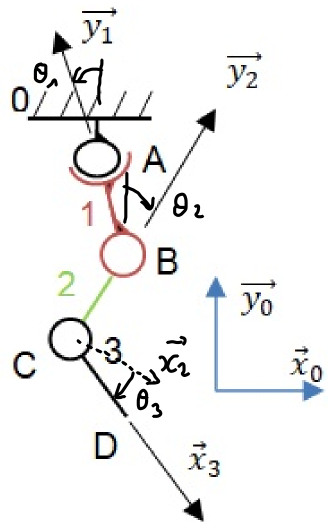
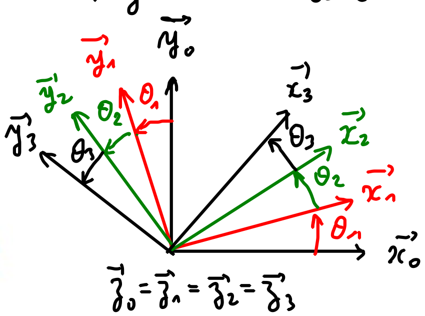


Figure de calcul :



④ $\vec{\Omega_{3/0}} = \vec{\Omega_{3/2}} + \vec{\Omega_{2/1}} + \vec{\Omega_{1/0}}$

$= \theta_3\,\vec{z_3} + \theta_2\,\vec{z_2} + \theta_1\,\vec{z_1}$

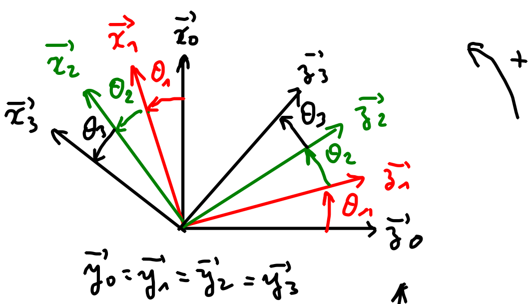
$$\boxed{\vec{\Omega_{3/0}} = (\theta_3 + \theta_2 + \theta_1)\,\vec{z_0}}$$

8h04

⑤ $\boxed{\begin{aligned} \vec{AB} &= L\,\vec{x_1} \\ \vec{BC} &= -L\,\vec{x_2} \\ \vec{CD} &= L\,\vec{x_3} \end{aligned}}$

⑥ Chasles : $\boxed{\vec{AD} = \vec{AB} + \vec{BC} + \vec{CD}}$

⑦



Le sens de rotation positive est trigonométrique si $\vec{z_0}$ est en bas : $\vec{z} \curvearrowright \vec{x}$ (de la fin de l'alphabet on revient au début).

8h09

⑧ $\boxed{\vec{x_1} \cdot \vec{x_0} = \cos(\theta_1)}$

$\vec{x_1} \cdot \vec{y_0} = \vec{x_1} \cdot \vec{y_1} = \cos\left(\frac{\pi}{2}\right) = 0$

$\vec{x_1} \cdot \vec{z_0} = \cos\left(\theta_1 - \frac{\pi}{2}\right) = -\sin(\theta_1)$

car la projection de $\vec{x_1}$ sur $\vec{z_0}$ est dans le sens opposé à $\vec{z_0}$

$\boxed{\begin{aligned} \vec{x_1} \cdot \vec{y_0} &= 0 \\ \vec{x_1} \cdot \vec{z_0} &= -\sin\theta_1 \end{aligned}}$

$\vec{y_1} \cdot \vec{x_0} = \vec{y_0} \cdot \vec{x_0}$

$\vec{y_1} \cdot \vec{y_0} = \vec{y_0} \cdot \vec{y_0}$

$\vec{y_1} \cdot \vec{z_0} = \vec{y_0} \cdot \vec{z_0}$

$\boxed{\begin{aligned} \vec{y_1} \cdot \vec{x_0} &= 0 \\ \vec{y_1} \cdot \vec{y_0} &= 1 \\ \vec{y_1} \cdot \vec{z_0} &= 0 \end{aligned}}$

$\vec{z_1} \cdot \vec{x_0} = \sin\theta$

$\vec{z_1} \cdot \vec{y_0} = 0$

$\vec{z_1} \cdot \vec{z_0} = \cos\theta$

8h16

(9) $\vec{AB} = L\,\vec{x}_1$

$$\boxed{\vec{AB} = L\left(\cos\theta_1\,\vec{x}_0 - \sin\theta_1\,\vec{z}_0\right)}$$

(10) $\vec{BC} = -L\,\vec{x}_2$

Par analogie avec $\vec{AB}$:

$$\vec{BC} = -L\left(\cos(\theta_1+\theta_2)\,\vec{x}_0 - \sin(\theta_1+\theta_2)\,\vec{z}_0\right)$$

$$\boxed{\vec{BC} = L\left(-\cos(\theta_1+\theta_2)\,\vec{z}_0 + \sin(\theta_1+\theta_2)\,\vec{z}_0\right)}$$

8h20