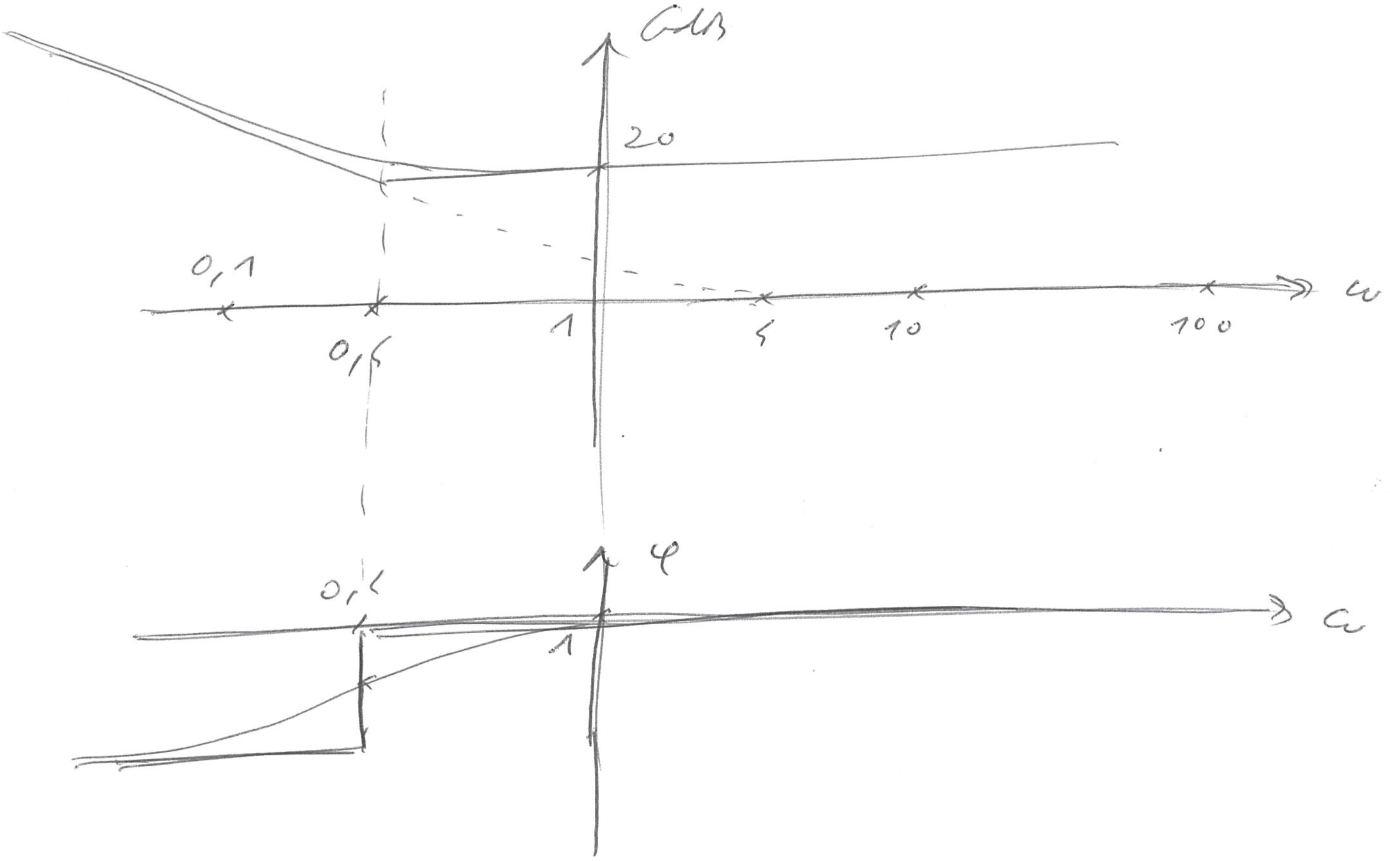
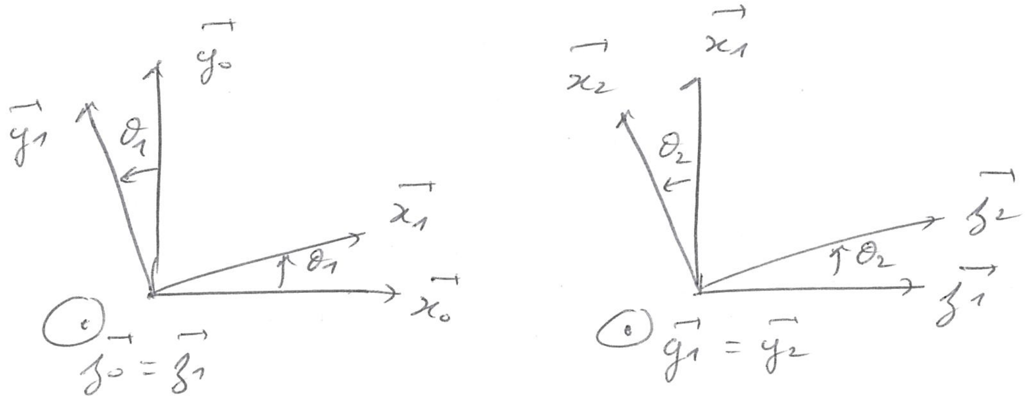
① Correction DS de SI, PCSI 1, janv 25

Exo 1 $H(p) = \dfrac{5(1+2{,}5p)}{p}$



Exo 2

Q1



Q2 $\vec{v}(O_2 \in 2/0) = \left(\dfrac{d\,\overrightarrow{O_0O_2}}{dt}\right)_0$

$\overrightarrow{O_0O_2} = a\vec{x_1} + b\vec{z_0} + c\vec{x_2}$

$\left(\dfrac{d\vec{x_2}}{dt}\right)_0 = \left(\dfrac{d\vec{x_2}}{dt}\right)_1 + \vec{\Omega}_{1/0} \wedge \vec{x_2} = -\dot{\theta}_2\vec{z_2} + \dot{\theta}_1\vec{z_1} \wedge (\cos\theta_2\vec{x_1} + \sin\theta_2\vec{z_1})$

$= -\dot{\theta}_2 \cdot \vec{z_2} + \dot{\theta}_1\cos\theta_2\,\vec{y_1}$

(2)

$$\vec{v}(O_2 \in 2/0) = a\dot{\theta}_1 \cdot \vec{y_1} - c\dot{\theta}_2 \vec{z_2} + c\dot{\theta}_1 \cos\theta_2 \vec{y_1}$$

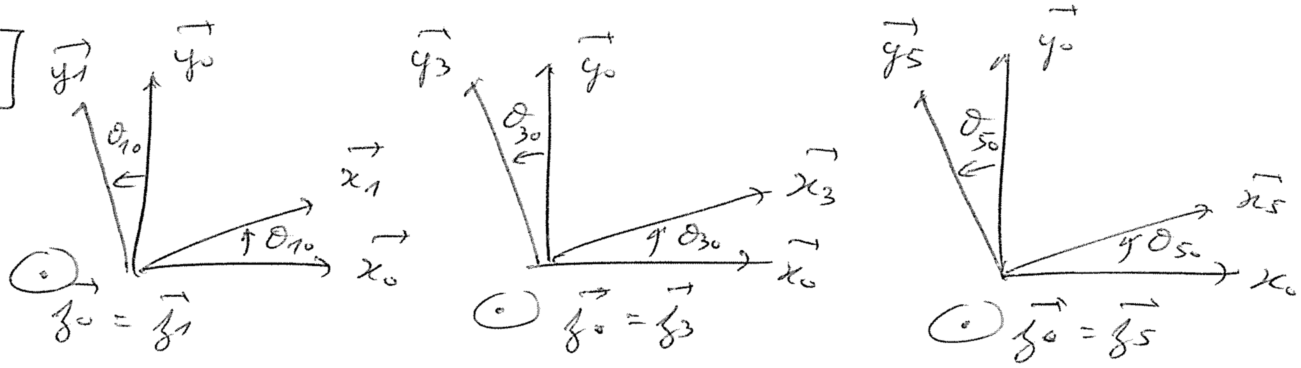
(Q3) $$\vec{v}(O_2 \in 2/0) = \underbrace{\vec{v}(O_1 \in 2/0)}_{} + \vec{\Omega}_{2/0} \wedge \vec{O_1O_2}$$

$$= \underbrace{\vec{v}(O_1 \in 2/1)}_{\vec{0}} + \underbrace{\vec{v}(O_1 \in 1/0)}_{\underbrace{\vec{v}(O_0 \in 1/0)}_{\vec{0}} + \vec{\Omega}_{1/0} \wedge \vec{O_0O_1}}$$

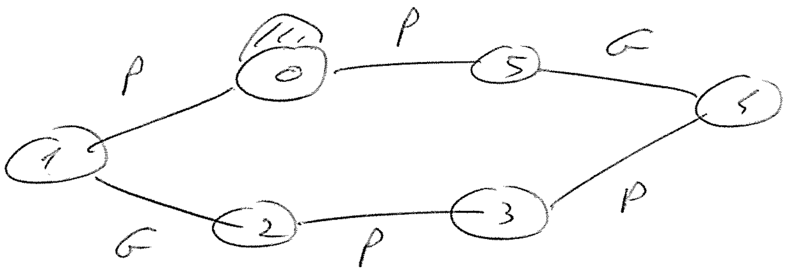
Finalement : $\vec{v}(O_2 \in 2/0) = \vec{\Omega}_{2/0} \wedge \vec{O_1O_2} + \vec{\Omega}_{1/0} \wedge \vec{O_0O_1}$

$\boxed{\text{Exo 3}}$

(Q2)



(Q1)



P : Pivot

G : Glissière.

(Q3) $\vec{AB} + \vec{BC} + \vec{CD} = \vec{AD} \Longrightarrow \lambda \vec{x_1} + a\vec{x_3} + \mu \vec{x_5} = L\vec{x_0}$

$$\begin{cases} \lambda \cos\theta_{10} + a\cos\theta_{30} + \mu\cos\theta_{50} = L \\ \lambda \sin\theta_{10} + a\sin\theta_{30} + \mu\sin\theta_{50} = 0 \end{cases}$$

(Q4) $\theta_{10} + \theta_{31} = \theta_{30}$; $\theta_{30} + \theta_{53} = \theta_{50}$; $\theta_{10} + \theta_{31} + \theta_{53} = \theta_{50}$

(Q5) $$\vec{v}(B \in 2/0) = \left(\frac{d\vec{AB}}{dt}\right)_0$$

$$\vec{AB} = \lambda \vec{x_1}$$

$$\vec{v}(B \in 2/0) = \dot{\lambda}\vec{x_1} + \lambda\dot{\theta}_{10}\vec{y_1}$$