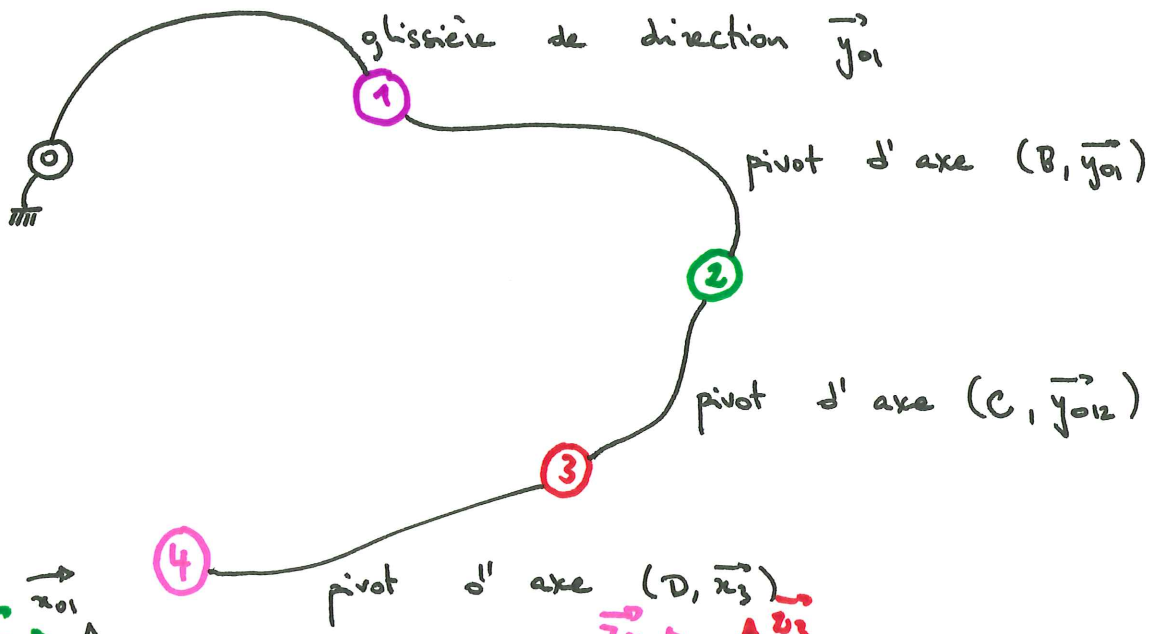
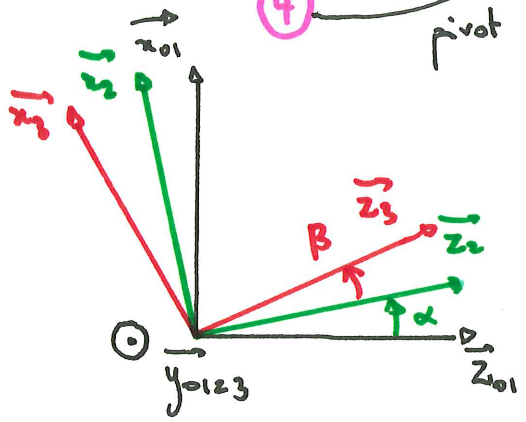
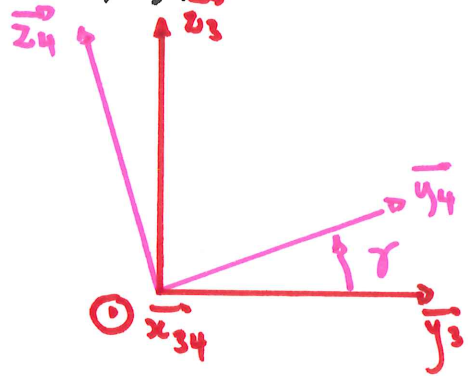
Robot KUKA

1



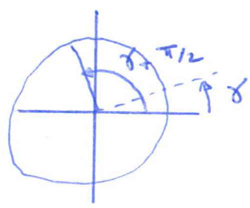




2 $\vec{V}_{P\in 4/0} = \vec{V}_{P\in 4/3} + \vec{V}_{P\in 3/2} + \vec{V}_{P\in 2/1} + \vec{V}_{P\in 1/0}$

- $\vec{V}_{P\in 4/3} = \vec{V}_{D\in 4/3} + \vec{PD} \wedge \vec{\Omega}_{4/3}$

$$= \vec{0} - (d\cdot\vec{x_{34}} + e\cdot\vec{z_4}) \wedge (\dot{\gamma}\cdot\vec{x_{34}})$$
$$= -e\cdot\dot{\gamma}\cdot\vec{y_4}$$



- $\vec{V}_{P\in 3/2} = \vec{V}_{C\in 3/2} + \overbrace{\vec{PC}}^{= \vec{PD}+\vec{DC}} \wedge \vec{\Omega}_{3/2}$

$$= \vec{0} - (d\cdot\vec{x_{34}} + e\cdot\vec{z_4} + c\cdot\vec{x_{34}}) \wedge (\dot{\beta}\cdot\vec{y_{0123}})$$
$$= -(c+d)\cdot\dot{\beta}\cdot\vec{z_3} + e\cdot\dot{\beta}\cdot\sin\left(+\gamma + \frac{\pi}{2}\right)\cdot\vec{x_{34}}$$
$$= -(c+d)\cdot\dot{\beta}\cdot\vec{z_3} + e\cdot\dot{\beta}\cdot\cos\gamma\cdot\vec{x_{34}}$$

- $\vec{V}_{P\in 2/1} = \vec{V}_{B\in 2/1} + \vec{PB} \wedge \vec{\Omega}_{2/1}$

$$= \vec{0} - (d\cdot\vec{x_{34}} + e\cdot\vec{z_4} + c\cdot\vec{x_{34}} + b\cdot\vec{x_2}) \wedge (\dot{\alpha}\cdot\vec{y_{0123}})$$
$$= -(c+d)\cdot\dot{\alpha}\cdot\vec{z_3} + e\cdot\dot{\alpha}\cdot\cos\gamma\cdot\vec{x_{34}} - b\cdot\dot{\alpha}\cdot\vec{z_2}$$

- $\overrightarrow{J_{P\in 1/0}} = \dot{\mu} \cdot \overrightarrow{y_0}$

On a donc :

$$\overrightarrow{J_{P\in 4/0}} = - e . \dot{\gamma} . \overrightarrow{y_4} - (c+d) . (\dot{\alpha} + \dot{\beta}) . \overrightarrow{z_3} + e . (\dot{\alpha} + \dot{\beta}) . \cos \gamma . \overrightarrow{x_{34}} - b . \dot{\alpha} . \overrightarrow{z_2} + \dot{\mu} . \overrightarrow{y_0}$$

3 On veut que $\overrightarrow{J_{P\in 4/0}} \cdot \overrightarrow{x_{01}} = 0$

et $\overrightarrow{J_{P\in 4/0}} \cdot \overrightarrow{y_{01}} = 0$

Avec $\gamma = 0$, on a donc :

$$\overrightarrow{J_{P\in 4/0}} \cdot \overrightarrow{x_{01}} = -(c+d).(\dot{\alpha} + \dot{\beta}) . \sin(\alpha + \beta) + e . (\dot{\alpha} + \dot{\beta}) . \cos(\alpha + \beta) - b . \dot{\alpha} . \sin(\alpha) = 0$$

$$\overrightarrow{J_{P\in 4/0}} \cdot \overrightarrow{y_{01}} = \dot{\mu} = 0$$