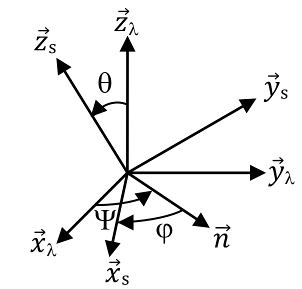
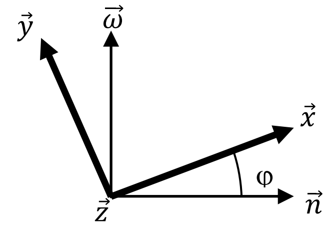
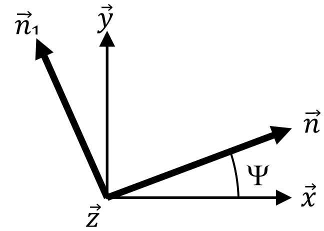
Formulaire de Mécanique Générale





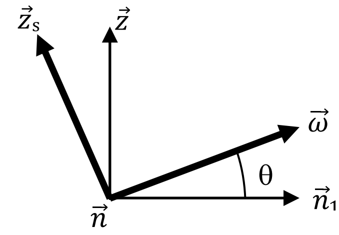
$\vec{n}.\vec{x_s} = \cos\varphi$

$\vec{n}\wedge\vec{x_s} = \sin\varphi\,\vec{z_s}$



$\vec{n} = \cos\Psi\,\vec{x_\lambda} + \sin\Psi\,\vec{y_\lambda}$

$\vec{n} = \cos\varphi\,\vec{x_s} - \sin\varphi\,\vec{y_s}$



$\vec{z_\lambda}.\vec{z_s} = \cos\theta$

$\vec{z_\lambda}\wedge\vec{z_s} = \vec{n}\sin\theta$

Vitesse :

$\vec{v}^{\lambda}_{(B)} = \overrightarrow{v_{(A)}} + \vec{\omega}^{\lambda}_{s}\wedge\overrightarrow{AB}$ Si A et B appartiennent au solide (s)

Accélération :

$$\gamma^{\lambda}(Ms) = \gamma^{\lambda}(Os) + \frac{ds.\vec{\omega}^{\lambda}_{s}}{dt}\wedge\overrightarrow{OsMs} + \vec{\omega}^{\lambda}_{s}\wedge\left(\vec{\omega}^{\lambda}_{s}\wedge\overrightarrow{OsMs}\right)$$

$$\vec{\omega}^{\lambda}_{s} = \dot{\Psi}\vec{z_\lambda} + \dot{\theta}\vec{n} + \dot{\varphi}\vec{z_s} \quad \text{(Eulérien)}$$

Torseur

$$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\}_{OS} = \left\{\vec{\omega}^{\lambda}_{s}\,|\,\vec{v}^{\lambda}_{(OS)}\right\}$$

$$\frac{d^{\lambda}\vec{u}}{dt} = \vec{\omega}^{\lambda}_{s}\wedge\vec{u} \qquad \frac{d^{\lambda}\vec{u}(\gamma)}{d\gamma} = \vec{u}(\gamma + \pi/2) \qquad \frac{d^{\lambda}\vec{u}(\gamma)}{dt} = \dot{\gamma}\vec{u}(\gamma + \pi/2)$$

Moment :

$$\overrightarrow{M_A}\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\} = \overrightarrow{M_B}\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\} + \vec{\omega}^{\lambda}_{s}\wedge\overrightarrow{BA}$$

$\vec{\omega}^{\lambda}_{s}$: Taux de rotation de (s)/(λ)

$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\}_{OS}$: Torseur cinématique

$\overrightarrow{M_B}$: Moment du torseur cinématique en B

Invariant Scalaire

$I = \vec{\omega}^{\lambda}_{s}.\vec{v}^{\lambda}_{(OS)}$

$\vec{\omega}^{\lambda}_{s} = \vec{\omega}^{e}_{s} + \vec{\omega}^{\lambda}_{e}$ et $\vec{\omega}^{\lambda}_{s} = -\vec{\omega}^{s}_{\lambda}$

$\vec{\omega}^{\lambda}_{s} = \vec{\omega}^{e}_{s} + \vec{\omega}^{\lambda}_{e}$

$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\} = 0$: Torseur nul, S immobile dans λ

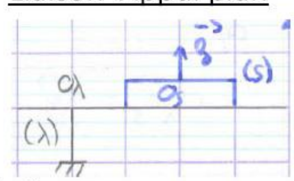
$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\} = \{0|\vec{v}\}$: Torseur couple, S en translation par rapport à λ

$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\} = \{\vec{\omega}^{\lambda}_{s}|0\}$: Glisseur

Ravignaux

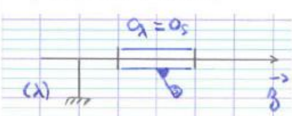
$$\omega_1 - \lambda\omega_3 + (\lambda - 1)\omega_4 = 0$$

Liaison Appui plan



$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = \left\{\dot{\gamma}\vec{z}\,|\,\dot{x}\vec{x}_\lambda + \dot{y}\vec{y}_\lambda\right\}$$

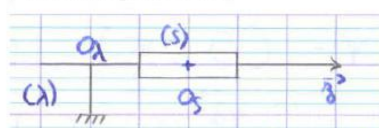
Liaison Pivot



$$\gamma = (\vec{x}_\lambda, \vec{x}_S) = (\vec{y}_\lambda, \vec{y}_S)$$

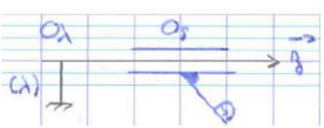
$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\}_{OS} = \left\{\dot{\gamma}\vec{z}\,|\,\vec{0}\right\}$$

Liaison glissière



$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = \left\{\vec{0}\,|\,\dot{z}\vec{z}\right\} \quad \overrightarrow{O_\lambda O_s} = z\vec{z}$$

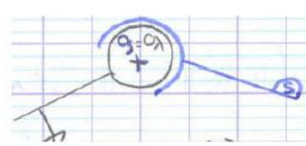
Liaison Pivot Glissant :



$$\left\{\begin{matrix}\lambda\\ s\end{matrix}\right\}_{OS} = \{\dot{\gamma}\vec{z}\,|\,\dot{z}\vec{z}\}$$

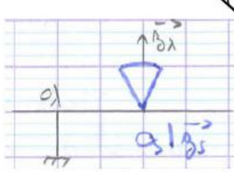
Liaison Rotule :

$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = \left\{\dot{\Psi}\vec{z}_\lambda + \dot{\theta}\vec{n} + \dot{\varphi}\vec{z}_S\,|\,\vec{0}\right\}$$

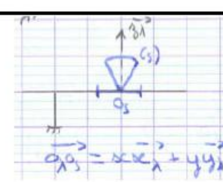


Liaison Linéique :

$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = \left\{\dot{\Psi}\vec{z}_\lambda + \dot{\varphi}\vec{z}_S\,|\,\dot{x}\vec{x}_\lambda + \dot{y}\vec{y}_\lambda\right\}$$

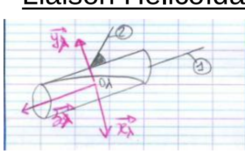


Liaison Ponctuelle



$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = \left\{\dot{\Psi}\vec{z}_\lambda + \dot{\theta}\vec{n} + \dot{\varphi}\vec{z}_S\,|\,\dot{x}\vec{x}_\lambda + \dot{y}\vec{y}_\lambda\right\}$$

Liaison Hélicoïdale

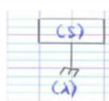


$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\}_{Os} = \left\{\dot{\gamma}\vec{z}_\lambda \,/\, \dot{z}\vec{z}_\lambda\right\}$

avec $\dot{z} = \frac{P}{2\pi}\dot{\gamma}$

P: pas en mm/tr

Liaison encastrement



$$\left\{\begin{matrix}\lambda\\ S\end{matrix}\right\} = 0$$