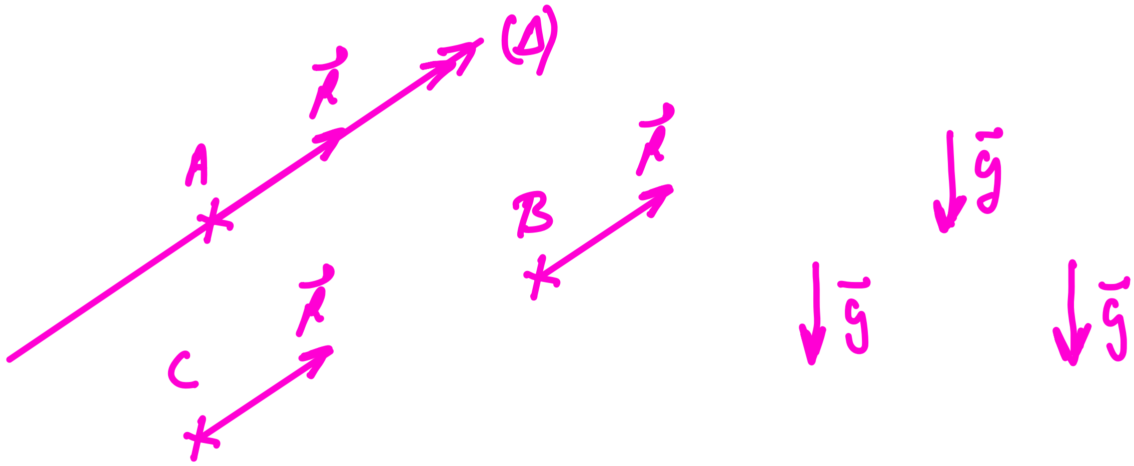
Les Torseurs

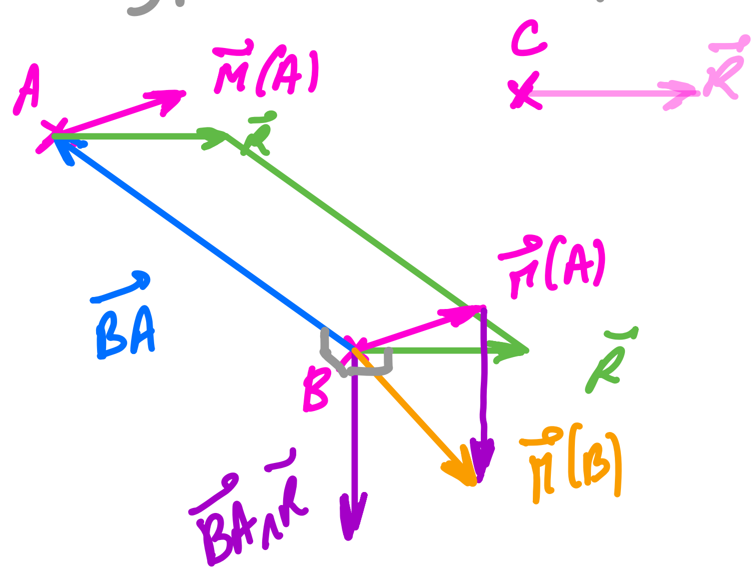
Champ de Vecteurs constant : $\vec{R}$ (Résultante)



Champ de Vecteurs Antisymétrique $\vec{M}(A)$

$$\vec{M}(B) = \vec{M}(A) + \vec{BA} \wedge \vec{R}$$ BABAR

$$\mathcal{C} = \{\vec{R}, \vec{M}(A)\}_A \equiv \{\vec{R}, \vec{M}(B)\}_B$$ (Varignon)



Torseur : $\mathcal{C} = \{\vec{R}, \vec{M}(A)\}_A \equiv \{\vec{R}, \vec{M}(B)\}_B$

$$= \begin{vmatrix} R_X & M_X(A) \\ R_Y & M_Y(A) \\ R_Z & M_Z(A) \end{vmatrix}_A$$ (Pluckerien)

(b)

Somme de deux Torseurs

$$\mathcal{T}_1 = \{\vec{R}_1 , \vec{M}_1(A)\}_A$$

$$\mathcal{T}_2 = \{\vec{R}_2 , \vec{M}_2(B)\}_B$$

$$\mathcal{T}_1 + \mathcal{T}_2 = \{\vec{R}_1 + \vec{R}_2 , \vec{M}_1(C) + \vec{M}_2(C)\}_C$$

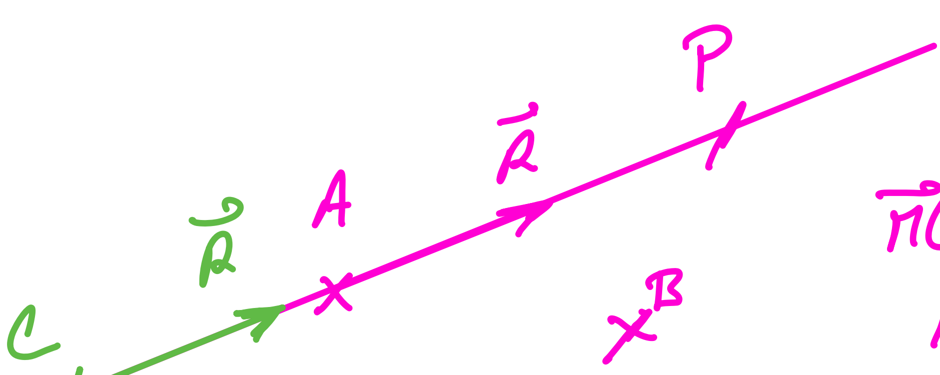
Multiplication de 2 Torseurs

$$\mathcal{T}_1 \otimes \mathcal{T}_2 = \vec{R}_1 \cdot \vec{M}_2(P) + \vec{R}_2 \cdot \vec{M}_1(P)$$

$$= \mathcal{C}_{\in \mathbb{R}} \quad \text{comoment}$$

Torseurs Particuliers

* $\{\vec{0} , \vec{0}\}_{\forall M}$ Torseur Nul
* $\{\vec{0} , \vec{M}(P)\}_{\forall P}$ Torseur Couple
* $\{\vec{R} , \vec{0}\}_{A, \forall P \in \Delta}$ Glisseur



$(\Delta) : (A , \vec{R})$

Axe

$\vec{M}(P) = \vec{M}(A) = \vec{0}$

pour $P \in \Delta$

Cinematique : $\mathcal{V}(S/R) = \left\{ \vec{\Omega}(S/R), \vec{V}(A, S/R) \right\}_B$

$$\vec{V}(B, S/R) = \vec{V}(A, S/R) + \vec{BA} \wedge \vec{\Omega}(S/R)$$

Resultante Cinematique → $\vec{\Omega}(S/R)$

"Moment" Cinematique → $\vec{V}(A, S/R)$

$$\begin{vmatrix} p & u \\ q & v \\ r & w \end{vmatrix} \qquad (b)\begin{vmatrix} \omega_x & V_x \\ \omega_y & V_y \\ \omega_z & V_z \end{vmatrix}_A$$

STATIQUE

$$\vec{M}(B, \vec{F}) = \vec{BM} \wedge \vec{F}$$

A

M $\vec{F}$

B

$$\vec{M}(B, \vec{F}) = \vec{M}(A, \vec{F}) + \vec{BA} \wedge \vec{F}$$

$$\mathcal{F} = \left\{ \vec{F}, \vec{M}(A, \vec{F}) \right\}_A$$

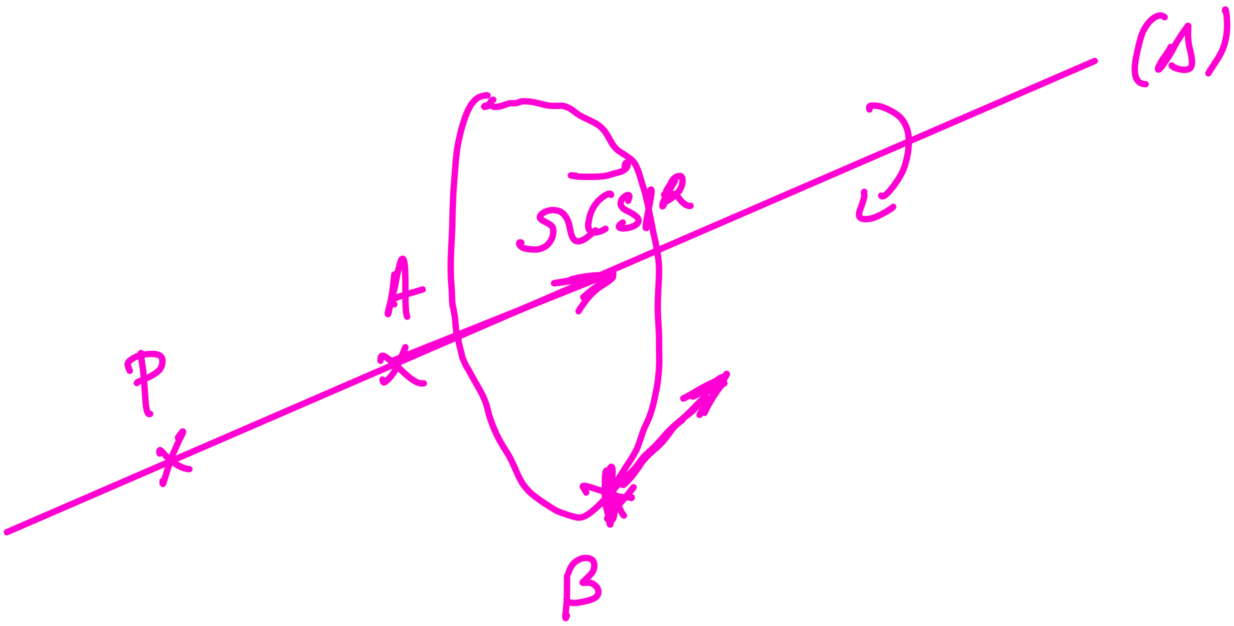
$$= (b)\begin{vmatrix} F_x & M_x(A) \\ F_y & M_y(A) \\ F_z & M_z(A) \end{vmatrix}_A \qquad \begin{vmatrix} X & L \\ Y & M \\ Z & N \end{vmatrix}$$

Resultante Statique : $\vec{F}$

Moment statique : $\vec{M}$

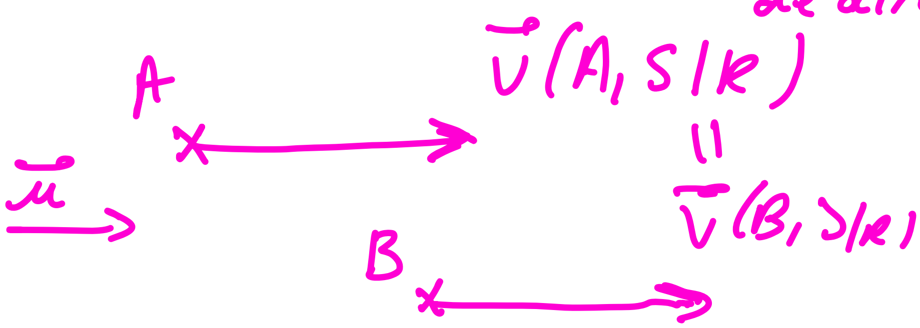
Glisseur : $\mathcal{V}(S/R) = \left\{ \vec{\Omega}(S/R) , \vec{0} \right\}_{A, \forall P \in \Delta}$

$\Delta : (A, \vec{\Omega}(S/R))$

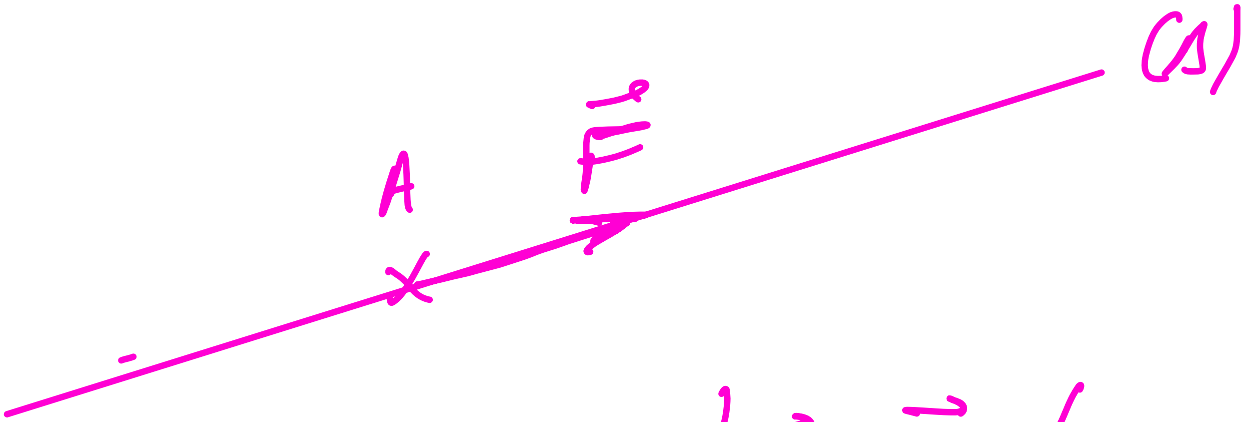


Couple $\left\{ \vec{0} , \vec{V}(P, S/R) \right\}_{P, \forall P}$

$\vec{\Omega}(S/R) = \vec{0} \longrightarrow$ Translation de direction $\vec{u}$



Statique : $\left\{\vec{F}, \vec{0}\right\}_A$



Couple $\left\{\vec{0}, \vec{C}_m\right\}_{\forall P}$