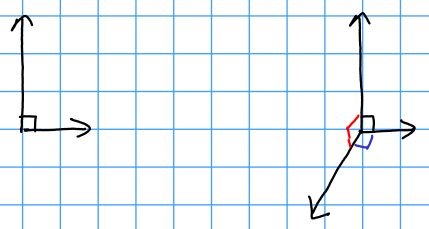
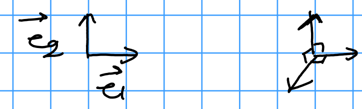
Sciences / Maths — **Chap 2. Les vecteurs.** — Cours 7

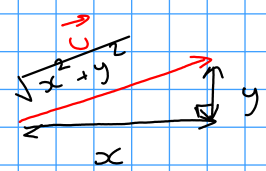


repères orthogonaux



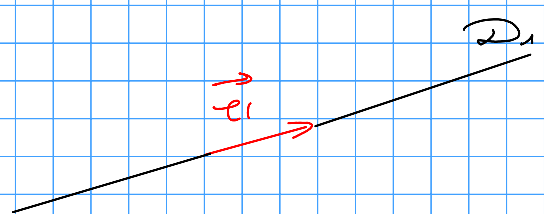
repères orthonormés

orienter.

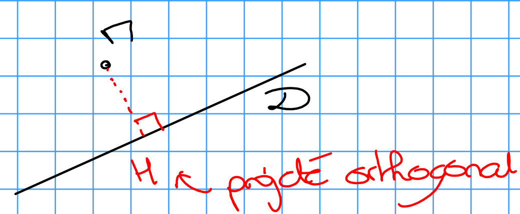


projeter

on projette



$$\vec{OP} = x_n \vec{e_1} = x_n \vec{e_1} + 0\,\vec{e_2}$$



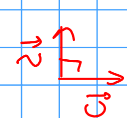
resp. : respectivement.

α : alpha.

β : beta.

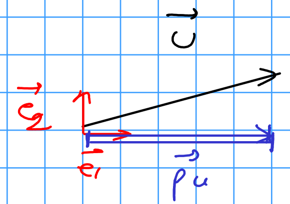
$$\vec{u}\cdot\vec{v} = \|\vec{u}\|\,\|\vec{v}\|\cos(\vec{u},\vec{v}) = 0$$

- $\|\vec{u}\| = 0$: $\vec{u} = \vec{0}$
- $\|\vec{v}\| = 0$: $\vec{v} = \vec{0}$
- $\cos(\vec{u},\vec{v}) = 0$



$\|\vec{p}_v\| = \|\vec{v}\| \cos(\alpha)$ si $\alpha \in [-\frac{\pi}{2}, \frac{\pi}{2}]$.

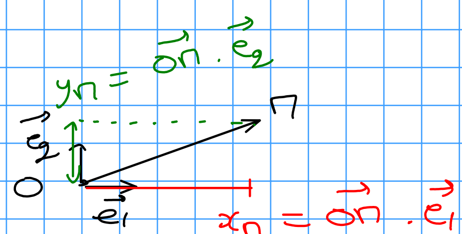
$\vec{u} \cdot \vec{v} = \|\vec{u}\| \underbrace{\|\vec{v}\| \cos(\alpha)} = \|\vec{u}\| \|\vec{p}_v\|$.



$\vec{u} \cdot \vec{e_1} = \|\vec{p_u}\|$

$\vec{u} \cdot \vec{v} = \begin{pmatrix} x \\ y \\ z \end{pmatrix} \cdot \begin{pmatrix} x' \\ y' \\ z' \end{pmatrix} = xx' + yy' + zz'$.

$(\lambda \vec{u} + \vec{v}) \cdot \vec{w} = \lambda \vec{u} \cdot \vec{w} + \vec{v} \cdot \vec{w}$



$\vec{OM} \cdot \vec{e_1}$

$= \begin{pmatrix} x_M \\ y_M \\ z_M \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} = x_M$

- $m\vec{a} = \vec{F_1} + \vec{F_2}$: équation vectorielle.

$\Leftrightarrow \begin{cases} m\vec{a} \cdot \vec{e_x} = \vec{F_1} \cdot \vec{e_x} + \vec{F_2} \cdot \vec{e_x} \\ m\vec{a} \cdot \vec{e_y} = \vec{F_1} \cdot \vec{e_y} + \vec{F_2} \cdot \vec{e_y} \end{cases}$

$\vec{a} \begin{pmatrix} a_x \\ a_y \end{pmatrix}$, $\vec{F_1} \begin{pmatrix} F_{1x} \\ F_{1y} \end{pmatrix}$

$\vec{F_2} \begin{pmatrix} F_{2x} \\ F_{2y} \end{pmatrix}$

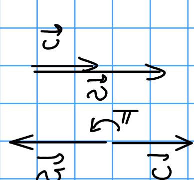
$\Leftrightarrow \begin{cases} ma_x = F_{1x} + F_{2x} \\ ma_y = F_{1y} + F_{2y} \end{cases}$.

$\vec{u} \cdot \vec{v}$: " u scalaire v ".

$|\vec{u} \cdot \vec{v}| = | \|\vec{u}\| \|\vec{v}\| \cos(\vec{u}, \vec{v}) |$

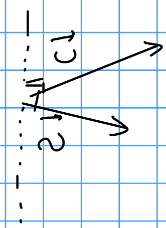
$= \underbrace{\|\vec{u}\|}_{\geq 0} \underbrace{\|\vec{v}\|}_{\geq 0} \underbrace{|\cos(\vec{u}, \vec{v})|}_{\leq 1} \leq \|\vec{u}\| \|\vec{v}\|$.

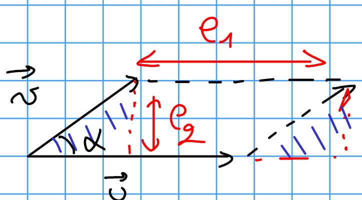
$|\cos(\vec{u}, \vec{v})| = 1$ ssi $(\vec{u}, \vec{v}) = 0$ ou π



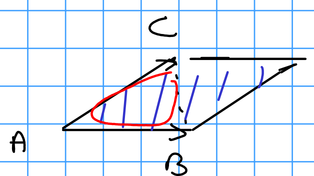
produit scalaire : nombre

produit vectoriel : vecteur.





$$\mathcal{A} = e_1 \times e_2$$
$$= \|\vec{u}\| \, \|\vec{v}\| \sin \alpha$$
$$= \| \vec{u} \wedge \vec{v} \|$$



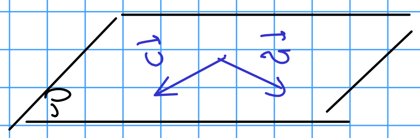
$$\frac{1}{2} \| \overrightarrow{AB} \wedge \overrightarrow{AC} \|$$

$$\|\vec{u}\| \, \|\vec{v}\| \underbrace{\sin(\vec{u}, \vec{v})}_{=0} = 0$$

$$(\vec{u}, \vec{v}) = 0 \text{ ou } \pi.$$

$$\begin{pmatrix} \cancel{x} \\ y \\ z \end{pmatrix} \wedge \begin{pmatrix} \cancel{x'} \\ y' \\ z' \end{pmatrix} = \begin{pmatrix} yz' - zy' \\ zx' - xz' \\ xy' - yx' \end{pmatrix}$$

$$\begin{pmatrix} x \\ \cancel{y} \\ z \end{pmatrix} \wedge \begin{pmatrix} x' \\ \cancel{y'} \\ z' \end{pmatrix} \qquad \begin{pmatrix} x \\ y \\ \cancel{z} \end{pmatrix} \wedge \begin{pmatrix} x' \\ y' \\ \cancel{z'} \end{pmatrix}$$



$\vec{u} \in \mathcal{P}$, $\vec{v} \in \mathcal{P}$

et $\vec{u}$ et $\vec{v}$ ne sont pas colinéaires.

$\vec{w} \in \mathcal{P}$ ssi il existe $(\lambda, \mu) \in \mathbb{R}^2$ tel que $\vec{w} = \lambda \vec{u} + \mu \vec{v}$.