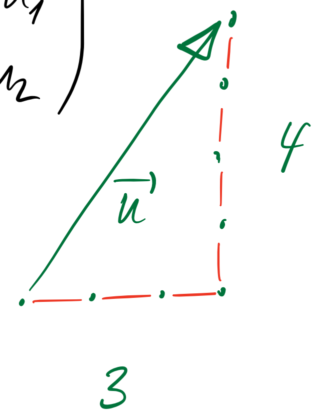
Vecteurs

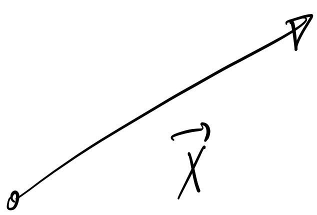
PLAN : 2D

$$\vec{u} = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix}$$

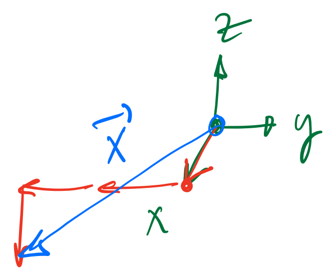
Exemple : $\vec{u} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ ← α



ESPACE : 3D



$$\vec{x} = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

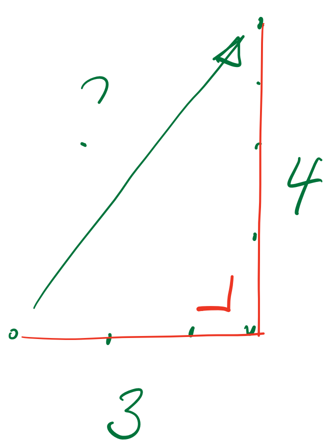


Exemple : $\vec{x} = \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix}$

Longueur d'un vecteur

NORME = LONGUEUR

Exemple : $\vec{v} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

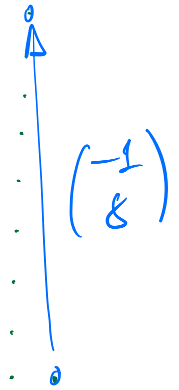


$$\sqrt{3^2+4^2} = \sqrt{9+16}$$
$$= \sqrt{25} = 5$$

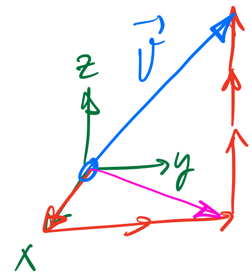
Notation : $\|\vec{u}\| = 5$ La norme de $\vec{u}$ vaut 5.

$$\left\| \begin{pmatrix} -1 \\ 8 \end{pmatrix} \right\| = \sqrt{(-1)^2 + 8^2} = \sqrt{1+64} = \sqrt{65}$$

$$\simeq 8{,}06$$



Exemple : $\vec{v} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \begin{array}{l} \leftarrow Ox \\ \leftarrow Oy \\ \leftarrow Oz \end{array}$



$$\underbrace{\|\vec{v}\|} = \sqrt{1^2+2^2+3^2}$$

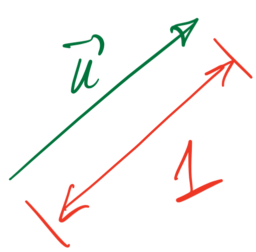
norme de $\vec{v}$ = longueur de $\vec{v}$

$$\|\vec{v}\| = \sqrt{v_1^{\,2} + v_2^{\,2} + v_3^{\,2}} \qquad \text{si } \vec{v} = \begin{pmatrix} v_1 \\ v_2 \\ v_3 \end{pmatrix}$$

$\boxed{\text{Définition}}$

Un vecteur est dit UNITAIRE si sa norme vaut 1.

2D $\quad \vec{u} = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix}$



unitaire $\Leftrightarrow \sqrt{u_1^2+u_2^2} = 1$

3D $\vec{x} = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$ unitaire $\Leftrightarrow$ $\|\vec{x}\| = \sqrt{x_1^2 + x_2^2 + x_3^2} = 1$

Opérations

somme

$\vec{a} + \vec{b} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + \begin{pmatrix} b_1 \\ b_2 \end{pmatrix} = \begin{pmatrix} a_1 + b_1 \\ a_2 + b_2 \end{pmatrix}$

$3 \cdot \vec{u} = 3 \cdot \begin{pmatrix} u_1 \\ u_2 \\ u_3 \end{pmatrix} = \begin{pmatrix} 3u_1 \\ 3u_2 \\ 3u_3 \end{pmatrix}$

multiplication par un nombre

EXERCICES 1.4.1 à 1.4.5