

Isoler en composantes

vecteur
↓

$$\vec{a} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} \begin{matrix} O_x \\ O_y \\ O_z \end{matrix} \quad a_i \in \mathbb{R}$$

3D

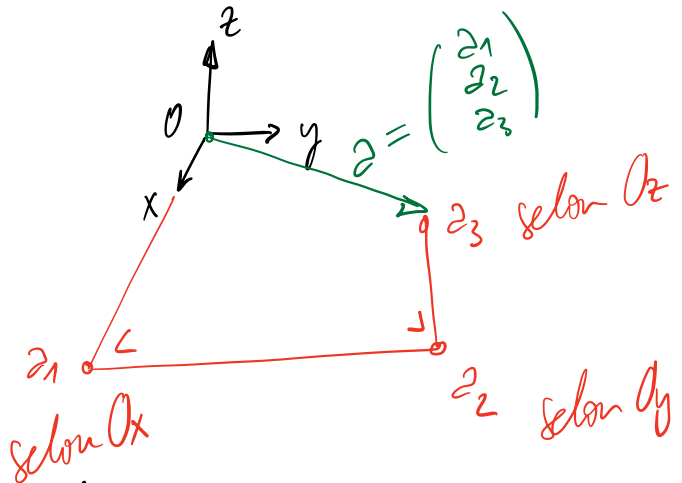
$$\vec{a} \in \mathbb{R}^3$$

$$\vec{b} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix}$$

scalaire
↙

Opérations: $k \in \mathbb{R}$

$$k \cdot \vec{a} = k \cdot \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} = \begin{pmatrix} k a_1 \\ k a_2 \\ k a_3 \end{pmatrix}$$



Exemple: $\vec{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad k = 1,5 \quad k \cdot \vec{a} = \begin{pmatrix} 1,5 \cdot 1 \\ 1,5 \cdot 2 \\ 1,5 \cdot 3 \end{pmatrix} = \begin{pmatrix} 1,5 \\ 3 \\ 4,5 \end{pmatrix}$

$$\vec{a} + \vec{b} = \begin{pmatrix} a_1 \\ a_2 \\ a_3 \end{pmatrix} + \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix} = \begin{pmatrix} a_1 + b_1 \\ a_2 + b_2 \\ a_3 + b_3 \end{pmatrix}$$

$$\vec{a} + \vec{b} = \vec{b} + \vec{a} \quad -\vec{b} = (-1) \cdot \vec{b}$$

$$(\vec{a} + \vec{b}) + \vec{c} = \vec{a} + (\vec{b} + \vec{c})$$

$$\vec{a} + \vec{0} = \vec{0} + \vec{a} = \vec{a}$$

$$\vec{0} + \vec{0} = \vec{0}$$

$$u = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \quad v = \begin{pmatrix} v_1 \\ v_2 \end{pmatrix}$$

$$u, v \in \mathbb{R}^2$$

$$k \cdot u = \begin{pmatrix} ku_1 \\ ku_2 \end{pmatrix} \quad u+v = \begin{pmatrix} u_1+v_1 \\ u_2+v_2 \end{pmatrix}$$

Exemple: $a = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \quad b = \begin{pmatrix} -3 \\ 8 \end{pmatrix}$

$3a - 4b$ ^{donné} $= 3 \begin{pmatrix} 1 \\ 2 \end{pmatrix} - 4 \begin{pmatrix} -3 \\ 8 \end{pmatrix}$

$$= \begin{pmatrix} 3 \\ 6 \end{pmatrix} + \begin{pmatrix} 12 \\ -32 \end{pmatrix} = \begin{pmatrix} 15 \\ -26 \end{pmatrix}$$

$$\left(\frac{x}{2} + \frac{z}{3}\right)\left(y - \frac{1}{2}\right) = \frac{1}{12} (2y - 1)(3x + 2z)$$

$$= \frac{1}{2} (2y - 1) \cdot \frac{1}{6} (3x + 2z)$$

$$= \left(\frac{2y}{2} - \frac{1}{2}\right) \left(\frac{3x}{6} + \frac{2z}{6}\right)$$

$$= \left(y - \frac{1}{2}\right) \left(\frac{x}{2} + \frac{z}{3}\right)$$

Donnée fautive

$$3x^4y^3z + x^4y^3 + 3x^3y^4z - 3x^2y^5z - x^2y^5 + x^3y^4 =$$

$$x^2y^3 \left(3xz^2 + x^2 + 3xy^2z - 3y^2z - y^2 + xy \right) =$$

$$x^2y^3 \left(x^2(3z+1) - y^2(3z+1) + xy(3z+1) \right) =$$

$$\boxed{x^2y^3(3z+1)(x^2+xy-y^2)}$$

ERRATUM:

La donnée du 2.2.7 h) est fautive.

Il faut ajouter le terme x^3y^4 à la

fin de l'expression :

$$3x^4y^3z + x^4y^3 + 3x^3y^4z - 3x^2y^5z - x^2y^5 + x^3y^4$$