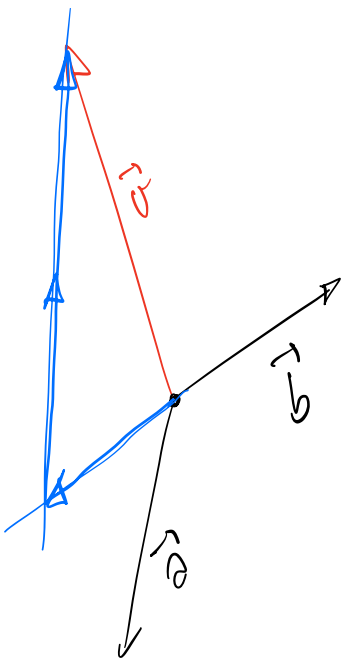
Dans le plan : 3 vecteurs non colinéaires

$(\vec{a}, \vec{b})$



GÉOMÉTRIE

On peut exprimer $\vec{v}$ comme COMBINAISON LINÉAIRE de $\vec{a}$ et $\vec{b}$

$$\vec{v} = -\vec{b} - 2\vec{a} = -2\vec{a} - \vec{b}$$

$$= \begin{pmatrix} -2 \\ -1 \end{pmatrix}$$

Même problème, purement ALGÉBRIQUE

$(\vec{e_1}, \vec{e_2})$

$$\vec{v} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad \vec{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \quad \vec{b} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 4 \end{pmatrix} = x \begin{pmatrix} 1 \\ 2 \end{pmatrix} + y \begin{pmatrix} -1 \\ -1 \end{pmatrix} \Leftrightarrow \begin{cases} x - y = 3 \\ 2x - y = 4 \end{cases}$$

$$\begin{array}{l|l|l} 1x - y = 3 & \cdot(-2) & \cdot(-1) \\ 2x - y = 4 & \cdot\ 1 & \cdot\ 1 \end{array}$$

$$\begin{cases} x = 1 \\ y = -2 \end{cases}$$

$$S = \{(1;-2)\}$$

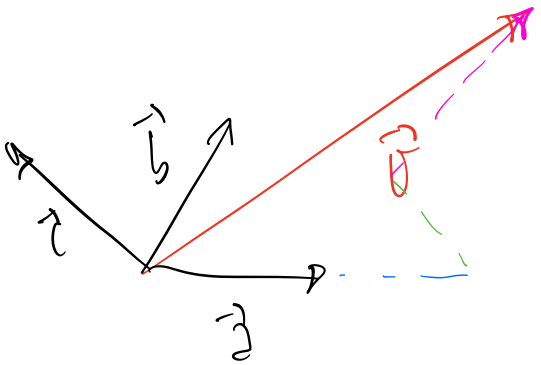
$$\begin{array}{l} -2x + 2y = -6 \\ 2x - y = 4 \end{array}$$

$$y = -2$$

$$\begin{array}{l} -x + y = -3 \\ 2x - y = 4 \end{array}$$

$$x = 1$$

$$\begin{pmatrix} 11 \\ 1 \\ 1 \end{pmatrix} = x \begin{pmatrix} 2 \\ 3 \\ 0 \end{pmatrix} + y \begin{pmatrix} 3 \\ 0 \\ -1 \end{pmatrix} + z \begin{pmatrix} 0 \\ -1 \\ 2 \end{pmatrix}$$



Dans l'espace

1.2.14 b)

$$\begin{cases} 2x+3y+0z=11 \\ 3x+0y-z=1 \\ 0x-y+2z=1 \end{cases} \quad \begin{matrix} \cdot 3 \\ \cdot(-2) \\ \\ \end{matrix}$$

$$\begin{cases} 6x+9y=33 \\ -6x+2z=-2 \\ -y+2z=1 \end{cases}$$

$L_2 \leftarrow L_2 + L_1$

$$\begin{cases} 2x+3y=11 \\ 9y+2z=31 \\ -y+2z=1 \end{cases} \quad \begin{matrix} \\ \cdot 1 \\ \cdot -1 \end{matrix}$$

$L_3 \leftarrow -L_3 + L_2$

$$\begin{cases} 2x+3y=1 \\ 9y+2z=31 \\ 10y=30 \end{cases}$$

$$\begin{cases} x=-4 \\ y=3 \\ z=6,5 \end{cases}$$

$2x = 1-3\cdot 3 = -8$

$x = -4$

$2z = 31-9\cdot 2 = 13$

$z = 13/2$

$y = 3$

$$2x + 3y + 0z = 11$$

$$3x + 0y - z = 1$$

$$0x - y + 2z = 1$$