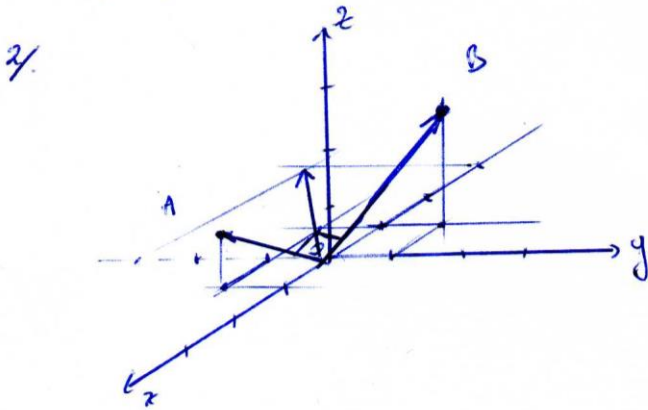


Exercice 1 :

$$1/ \begin{vmatrix} 1 \\ -1 \\ 1 \end{vmatrix} \wedge \begin{vmatrix} -1 \\ 1 \\ 2 \end{vmatrix} = -1 - 1 + 2 = 0 \quad \vec{OA} \perp \vec{OB}$$



$$3/ \begin{vmatrix} 1 \\ -1 \\ 1 \end{vmatrix} \wedge \begin{vmatrix} -1 \\ 1 \\ 2 \end{vmatrix} = \begin{vmatrix} -3 \\ -3 \\ 0 \end{vmatrix}$$

$$4/ (\vec{OA} \wedge \vec{OB}) \wedge \vec{OC} = \vec{0} \quad \text{car } (\vec{OA} \wedge \vec{OB}) \parallel \vec{OC}$$

$$5/ \|\vec{OA}\| = \sqrt{1+1+1} = \sqrt{3}$$

Exercice 2 :

$$\vec{A} \wedge (\vec{B} \wedge \vec{C}) = \begin{vmatrix} x_A & \wedge & \begin{vmatrix} x_B & x_C \\ y_B & y_C \\ z_B & z_C \end{vmatrix} \\ y_A & & \\ z_A & & \end{vmatrix} = \begin{vmatrix} x_A & \wedge & y_B z_C - z_B y_C \\ y_A & & z_B x_C - x_B z_C \\ z_A & & x_B y_C - y_B x_C \end{vmatrix}$$

$$= \begin{vmatrix} y_A x_B y_C - y_A y_B x_C - z_A z_B x_C + z_A x_B z_C \\ z_A y_B z_C - z_A z_B y_C - x_A x_B y_C + x_A y_B x_C \\ x_A x_C z_B - x_A z_B z_C - y_A y_B z_C + y_C z_B y_A \end{vmatrix}$$

$$= \begin{vmatrix} x_B (y_A y_C + z_A z_C) - x_C (y_A y_B + z_A z_B) \\ - \\ - \end{vmatrix}$$

$$= \begin{vmatrix} x_B (x_A x_C + y_A y_C + z_A z_C) - x_C (x_A x_B + y_A y_B + z_A z_B) \\ - \\ - \end{vmatrix}$$

$$= \vec{B} (\vec{A}, \vec{C}) - \vec{C} (\vec{A}, \vec{B})$$

Exercice 3 :

① 1^{ère} méthode : eq du type $y = ax + b$

$$\Rightarrow \begin{cases} -1 = -3a + b \\ 1 = 4a + b \end{cases} \Rightarrow a = \frac{2}{7} \text{ et } b = -\frac{1}{7}$$

$$d'_{OO} \Delta : 7y = 2x - 1.$$

2^{ème} méthode : $\forall (x, y) \in \Delta \Rightarrow \vec{AP} \wedge \vec{AB} = \vec{0}$

$$\Leftrightarrow \begin{vmatrix} x+3 & 7 \\ y+1 & 2 \end{vmatrix} = \begin{vmatrix} 0 \\ 0 \\ 2(x+3) - 7(y+1) \end{vmatrix} = \vec{0}$$

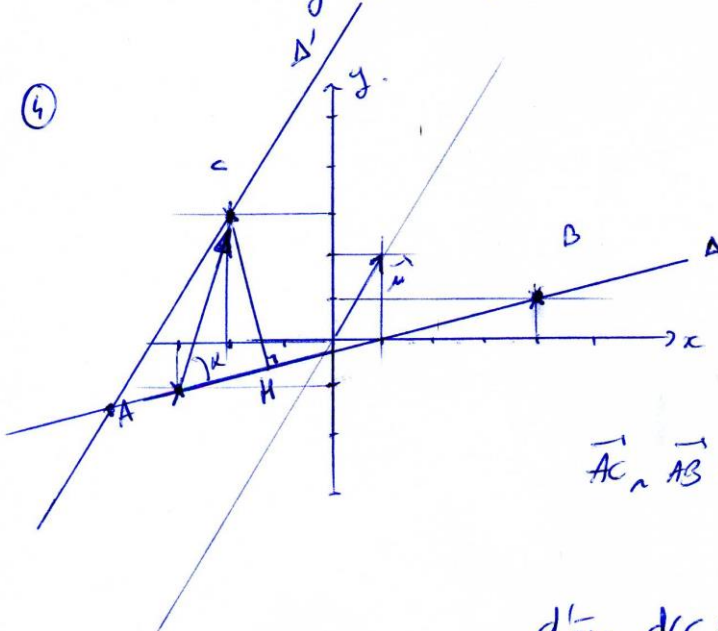
$$d'_{OO} \Delta : 2x - 7y - 1 = 0.$$

② $\forall (x, y) \in \Delta' \Rightarrow \vec{CP} \wedge \vec{u} = \vec{0} \Leftrightarrow \begin{vmatrix} x+2 & 1 \\ y-3 & 2 \end{vmatrix} = \begin{vmatrix} 0 \\ 0 \\ 2x+4-y+3 \end{vmatrix} = \vec{0}$

$$d'_{OO} \Delta' : 2x - y + 7 = 0$$

③ $\begin{cases} 2x - 7y - 1 = 0 \\ 2x - y + 7 = 0 \end{cases} \Rightarrow -6y - 8 = 0 \Rightarrow y = -\frac{4}{3} \quad x = -\frac{25}{6}$

④



$$\| \vec{AC} \wedge \frac{\vec{AB}}{\|\vec{AB}\|} \| = \|\vec{AC}\| \sin(\overrightarrow{AC}, \overrightarrow{AB})$$

$$CH = \|\vec{AC}\| \sin \alpha.$$

$$d'_{OO} \quad d(C, \Delta) = \|\vec{AC}\| \sin \alpha = \frac{\|\vec{AC} \wedge \vec{AB}\|}{\|\vec{AB}\|}$$

$$\vec{AC} \wedge \vec{AB} = \begin{vmatrix} 1 & 7 \\ 4 & 1 \\ 0 & 0 \end{vmatrix} = \begin{vmatrix} 0 \\ 0 \\ -26 \end{vmatrix} \quad \text{et } \|\vec{AB}\| = \sqrt{53}$$

$$d'_{OO} \quad d(C, \Delta) = \frac{26}{\sqrt{53}} \approx 3,6.$$

Exercice 4 :

$$\textcircled{1} \quad \forall P_i \Rightarrow \vec{AP} \perp \vec{n} \text{ avec } \vec{n} = \vec{AB} \wedge \vec{AC}.$$

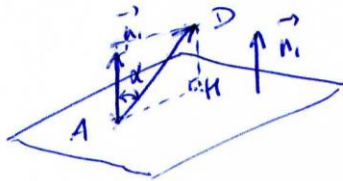
$$\Leftrightarrow \vec{AP} \cdot (\vec{AB} \wedge \vec{AC}) = 0 \Leftrightarrow \begin{vmatrix} x-1 \\ y-1 \\ z \end{vmatrix} \cdot \begin{pmatrix} -1 & 2 \\ 1 & -1 \\ 2 & 3 \end{pmatrix} = 0$$

$$\Leftrightarrow \begin{vmatrix} x-1 \\ y-1 \\ z \end{vmatrix} \cdot \begin{vmatrix} 5 \\ 7 \\ -1 \end{vmatrix} = 0 \Leftrightarrow 5x + 7y - z - 12 = 0$$

$$\textcircled{2} \quad \Delta \perp \vec{n}_1 \text{ et } \Delta \perp \vec{n}_2 \text{ donc vecteur directeur de } \Delta : \vec{n}_1 \wedge \vec{n}_2 = \vec{u}$$

$$\Rightarrow \vec{u} = \begin{vmatrix} 5 & 3 \\ 7 & -5 \\ -1 & 7 \end{vmatrix} = \begin{vmatrix} 44 \\ -38 \\ -46 \end{vmatrix} = \begin{vmatrix} 22 \\ -19 \\ -23 \end{vmatrix}$$

③



$$d(D, P_i) = HD$$

$$\|\vec{AD} \wedge \vec{n}_i\| = \|\vec{AD}\| \sin(\overbrace{(\vec{AD}, \vec{n}_i)}^{\alpha}) \text{ inutile.}$$

$$|\overbrace{\vec{AD} \cdot \vec{n}_i}^{\alpha}| = \|\vec{AD}\| |\cos(\overbrace{(\vec{AD}, \vec{n}_i)}^{\alpha})| = HD.$$

$$d'_{\omega} |HD| = \begin{vmatrix} 0 & 5 \\ -2 & 7 \\ 2 & -1 \end{vmatrix} = +16.$$

Exercice 5 :

$$1. \frac{\vec{AB} \wedge \vec{AC}}{\|\vec{AB} \wedge \vec{AC}\|} = \vec{z}$$

$$2. \frac{\vec{AB}}{\|\vec{AB}\|} = \vec{x}$$

$$3. \vec{y} = \vec{z} \wedge \vec{x}.$$

