$$\vec a \times (\vec b + \vec c) + \vec b \times (\vec c + \vec a) + \vec c \times (\vec a + \vec b) =$$

$$\vec a \times \vec b + \vec a \times \vec c + \vec b \times \vec c + \vec b \times \vec a + \vec c \times \vec a + \vec c \times \vec b =$$

$$\boxed{\vec a \times \vec b + \vec b \times \vec a} + \boxed{\vec a \times \vec c + \vec c \times \vec a} + \boxed{\vec b \times \vec c + \vec c \times \vec b} =$$

$$\underbrace{\vec a \times \vec b - \vec a \times \vec b}_{\vec 0} + \underbrace{\vec a \times \vec c - \vec a \times \vec c}_{\vec 0} + \underbrace{\vec b \times \vec c - \vec b \times \vec c}_{\vec 0} = \vec 0$$

$$\vec b \times \vec a = -\vec a \times \vec b$$

anticommutativité

$$\begin{vmatrix} \cancel{\vec i} & \cancel{a_1} & \cancel{(b_1+c_1)} \\ \cancel{\vec j} & a_2 & (b_2+c_2) \\ \cancel{\vec k} & a_3 & (b_3+c_3) \end{vmatrix} \quad \begin{pmatrix} a_2(b_3+c_3) - a_3(b_2+c_2) \\ \\ \\ \end{pmatrix} =$$

$$\boxed{\vec a \times (\vec b + \vec c)}$$

$$\begin{pmatrix} a_2 b_3 - a_3 b \\ \\ \\ \end{pmatrix} + \begin{pmatrix} a_2 c_3 - a_3 c_2 \\ \\ \\ \end{pmatrix}$$

$$\boxed{\vec a \times \vec b + \vec a \times \vec c}$$

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

$$\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \times \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \\ 7 \end{pmatrix}$$

$$2x_3 - 3x_2 = 4$$

$$3x_1 - x_3 = 5$$

$$x_2 - 2x_1 = 7$$

$$x_2 = 7 + 2x_1$$

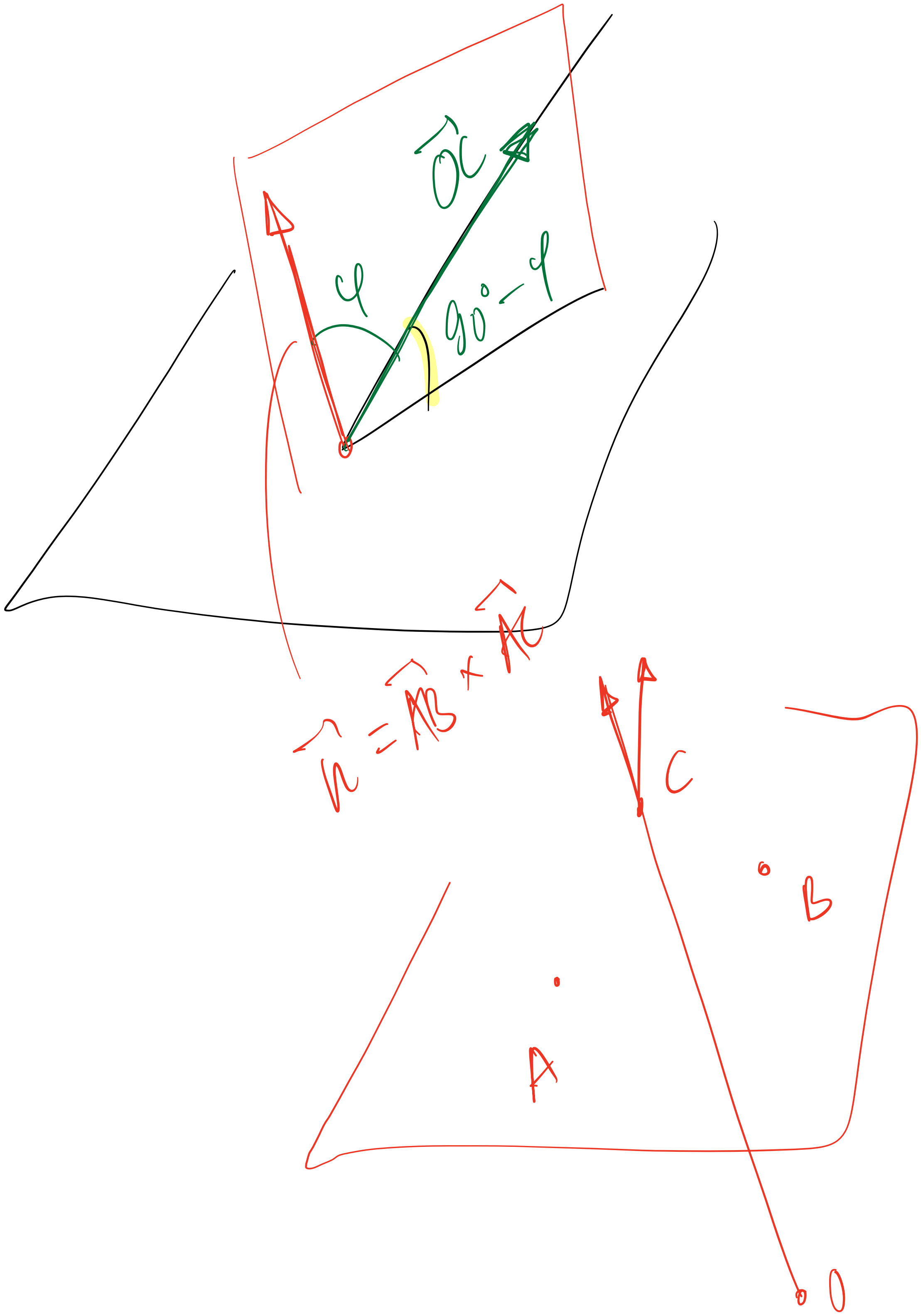
$$x_2 = \frac{2x_3 - 4}{3}$$

$$\begin{cases} 3x_1 - x_3 = 5 \\ 21 + 6x_1 = 2x_3 - 4 \end{cases}$$

$$x_3 = 3x_1 - 5$$

$$25 + 6x_1 = 6x_1 - 10$$

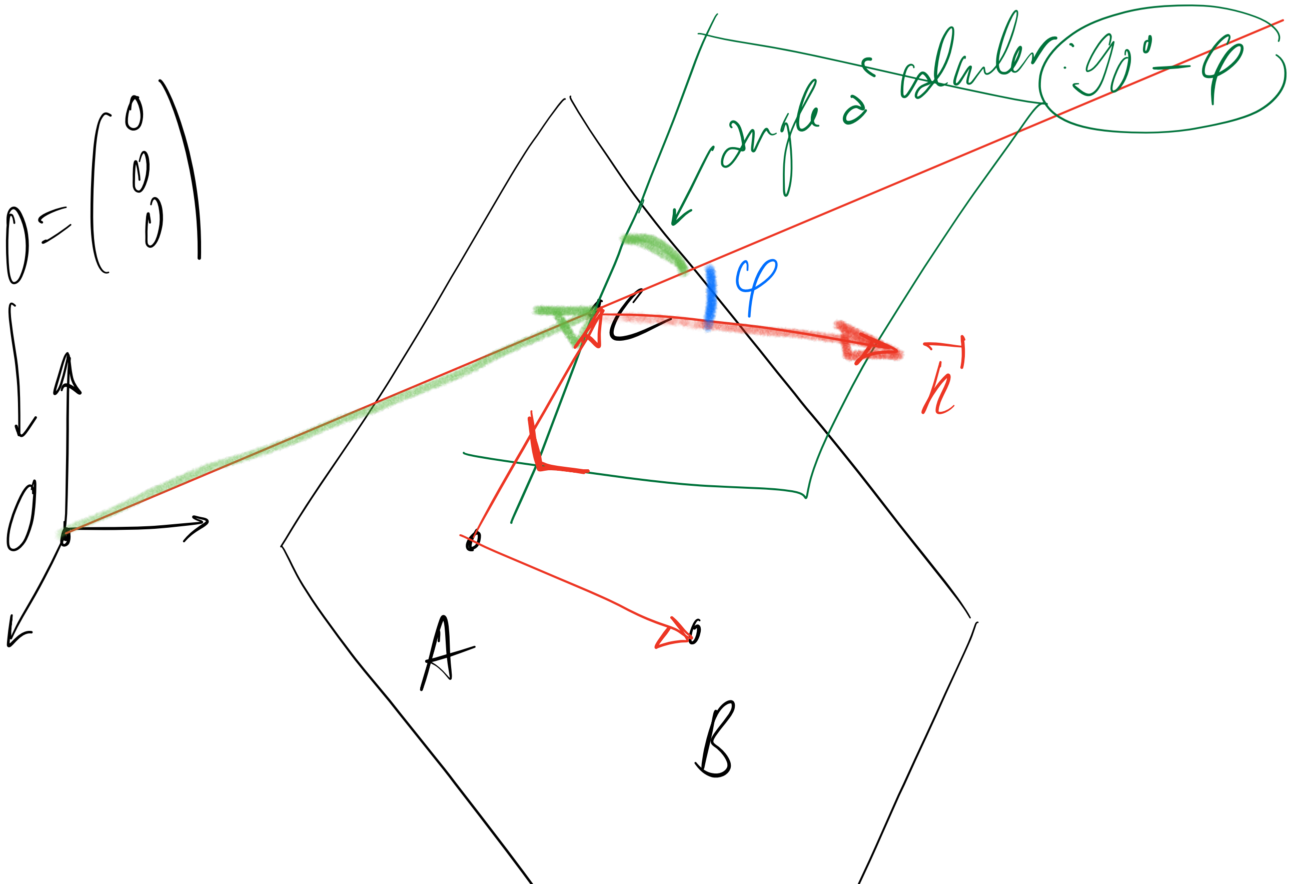
$$25 = -10 \quad \lightning$$



$\vec{OC}$
φ
$90^\circ - \varphi$
$\hat{n} = \hat{AB} \times \hat{AC}$
C
B
A
O

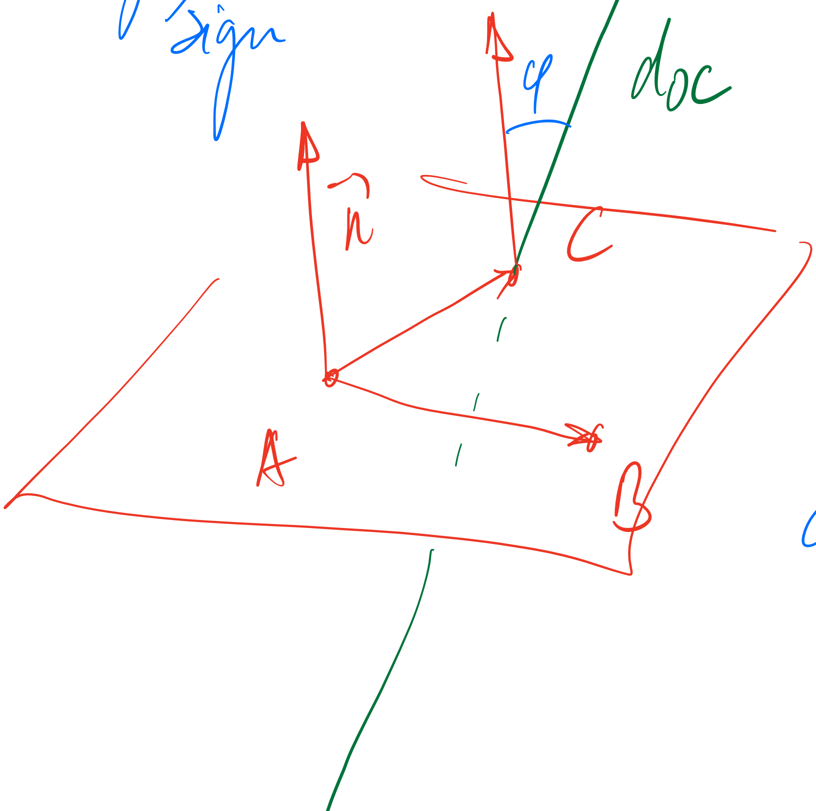
$$\begin{vmatrix} i & a_1 & b_1 \\ j & a_2 & b_2 \\ k & a_3 & b_3 \end{vmatrix} \qquad \begin{pmatrix} a_2 b_3 - a_3 b_2 \\ a_3 b_1 - a_1 b_3 \\ a_1 b_2 - a_2 b_1 \end{pmatrix}$$

$$-(a_1 b_3 - a_3 b_1)$$



$\vec{n} = \vec{AB} \times \vec{AC}$

φ : angle signé entre $\vec{n}$ et $\vec{OC}$



$$\sin \varphi = \frac{\|\vec{n} \times \vec{OC}\|}{\|\vec{n}\| \|\vec{OC}\|}$$

$$\cos \varphi = \frac{|\vec{n} \cdot \vec{OC}|}{\|\vec{n}\| \cdot \|\vec{OC}\|}$$

$a \in \mathbb{R}$

$$|a| = \begin{cases} a & \text{si } a \geq 0 \\ -a & \text{sinon} \end{cases}$$

$$\boxed{\vec{a} \cdot \vec{b} = \sum a_i b_i}$$

$$\det(\vec{a}\,;\vec{b}\,;\vec{c}\,) = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

$$\boxed{\|\vec{a}\| = \sqrt{\sum a_i^2}}$$

$$\boxed{\sqrt{\vec{a} \cdot \vec{a}} = \|\vec{a}\|}$$

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

$$\vec{a} \cdot \vec{a} = a_1 \cdot a_1 + a_2 \cdot a_2$$

$$= a_1^2 + a_2^2 = \left(\sqrt{a_1^2 + a_2^2}\right)^2$$

$$= \|\vec{a}\|^2$$