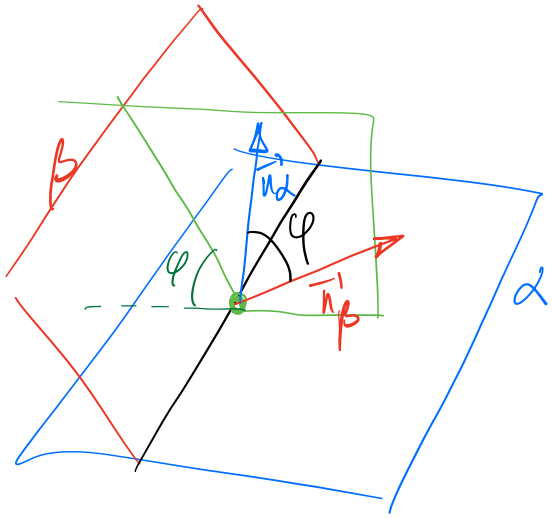
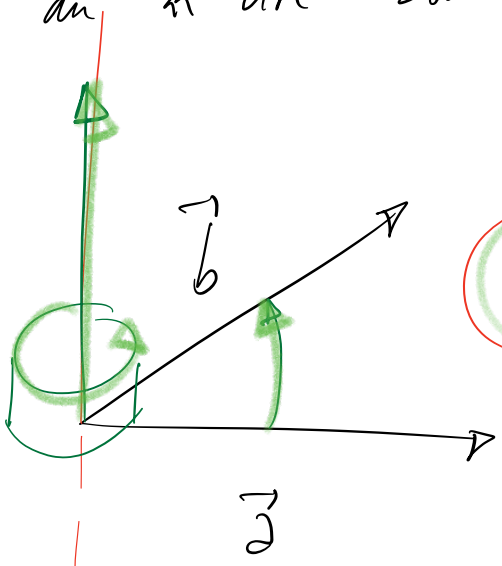


$$\text{angle}(\alpha;\beta) = \varphi$$

$$\varphi = \text{angle}\left(\vec{n}_\alpha ; \vec{n}_\beta\right)$$

Produit vectoriel

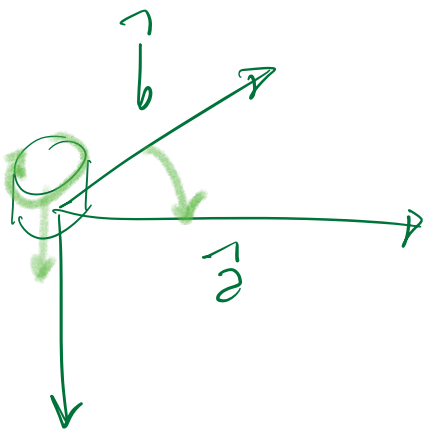
Règle du « tire-bouchon »



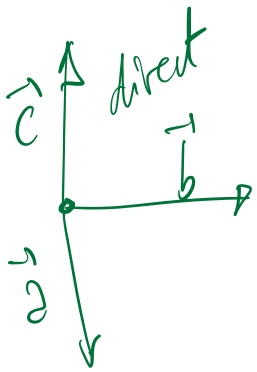
$\vec{a} \times \vec{b}$

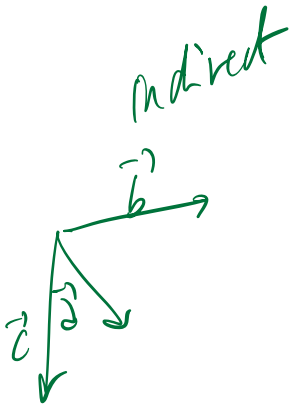
« de $\vec{a}$ vers $\vec{b}$ »

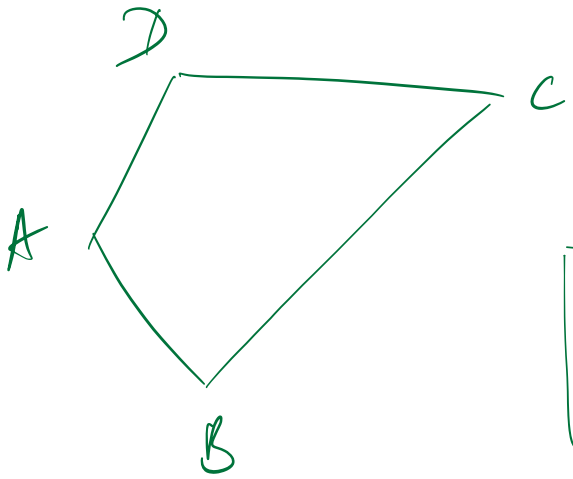
dévisse



$\vec{b} \times \vec{a}$





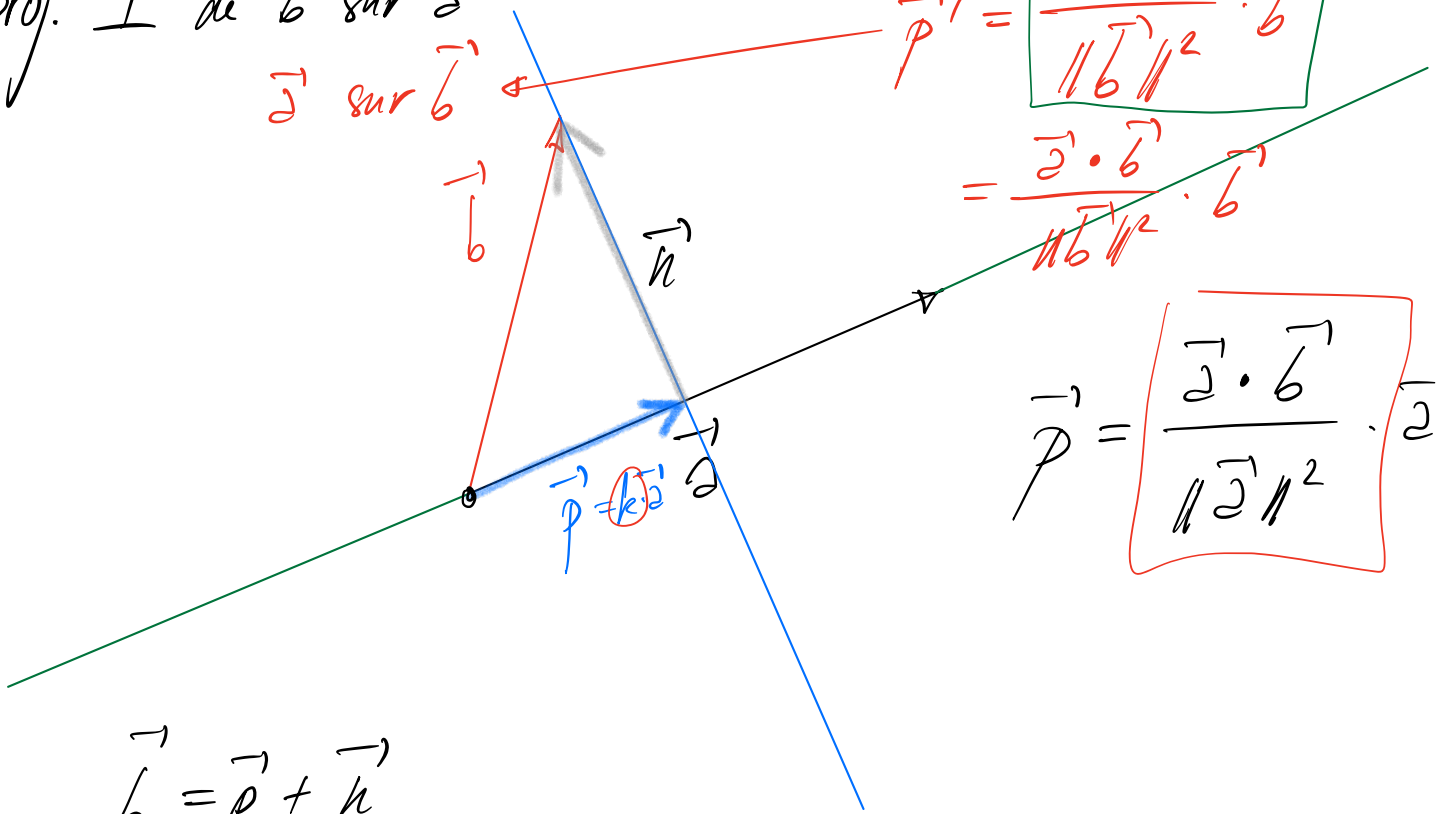


$\vec{AD} \parallel \vec{BC}$?

$\vec{AB} \parallel \vec{DC}$?

proj. ⊥ de $\vec{b}$ sur $\vec{a}$

$\vec{a}$ sur $\vec{b}$



$$\vec{p}' = \frac{\vec{b}\cdot\vec{a}}{\|\vec{b}\|^2}\cdot\vec{b}$$

$$= \frac{\vec{a}\cdot\vec{b}}{\|\vec{b}\|^2}\cdot\vec{b}$$

$$\vec{p} = \frac{\vec{a}\cdot\vec{b}}{\|\vec{a}\|^2}\cdot\vec{a}$$

$$\vec{b} = \vec{p} + \vec{h}$$

$$\vec{b} = k\cdot\vec{a} + \vec{h}$$

$$\vec{a}\cdot(k\cdot\vec{a}) = k\cdot(\vec{a}\cdot\vec{a})$$

$$\vec{a}\cdot\vec{b} = k\cdot\vec{a}\cdot\vec{a} + \underbrace{\vec{a}\cdot\vec{h}}_{0 \text{ car } \vec{a}\perp\vec{h}}$$

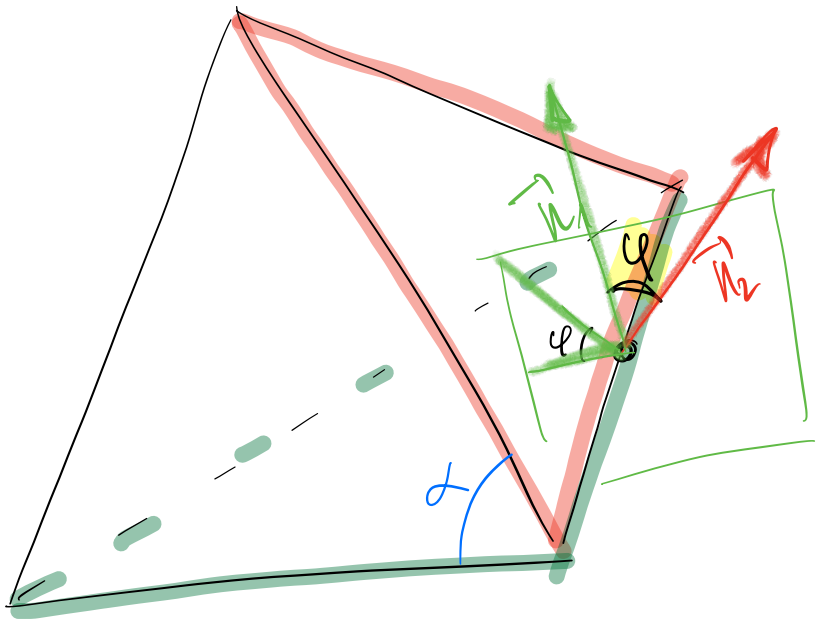
$$\vec{a}\cdot\vec{b} = k\cdot\|\vec{a}\|^2$$

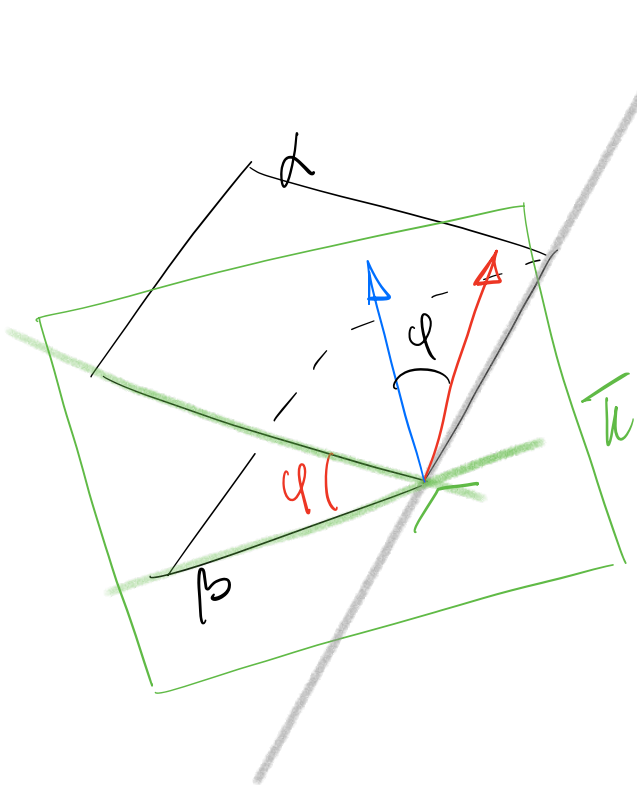
$$k = \frac{\vec{a}\cdot\vec{b}}{\|\vec{a}\|^2}$$

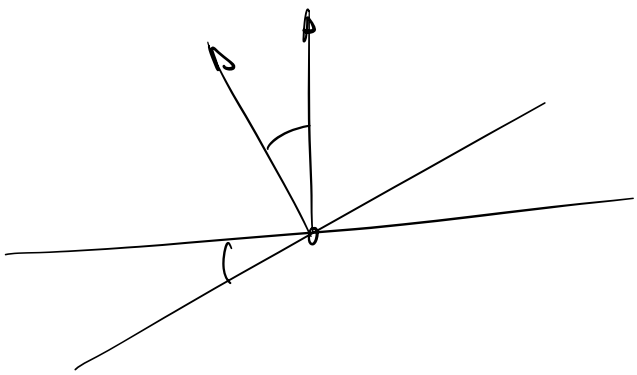
$$\vec{a}\cdot\vec{a} = \|\vec{a}\|^2$$

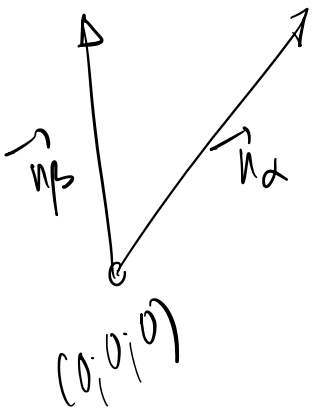
$$\sum a_i\cdot a_i = \sum a_i^2$$

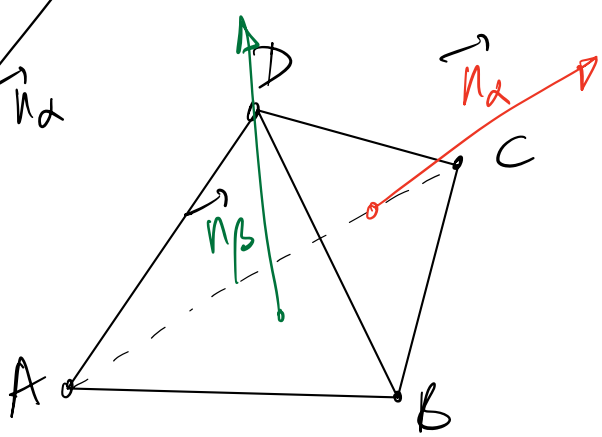
$$= \left(\sqrt{\sum a_i^2}\right)^2$$











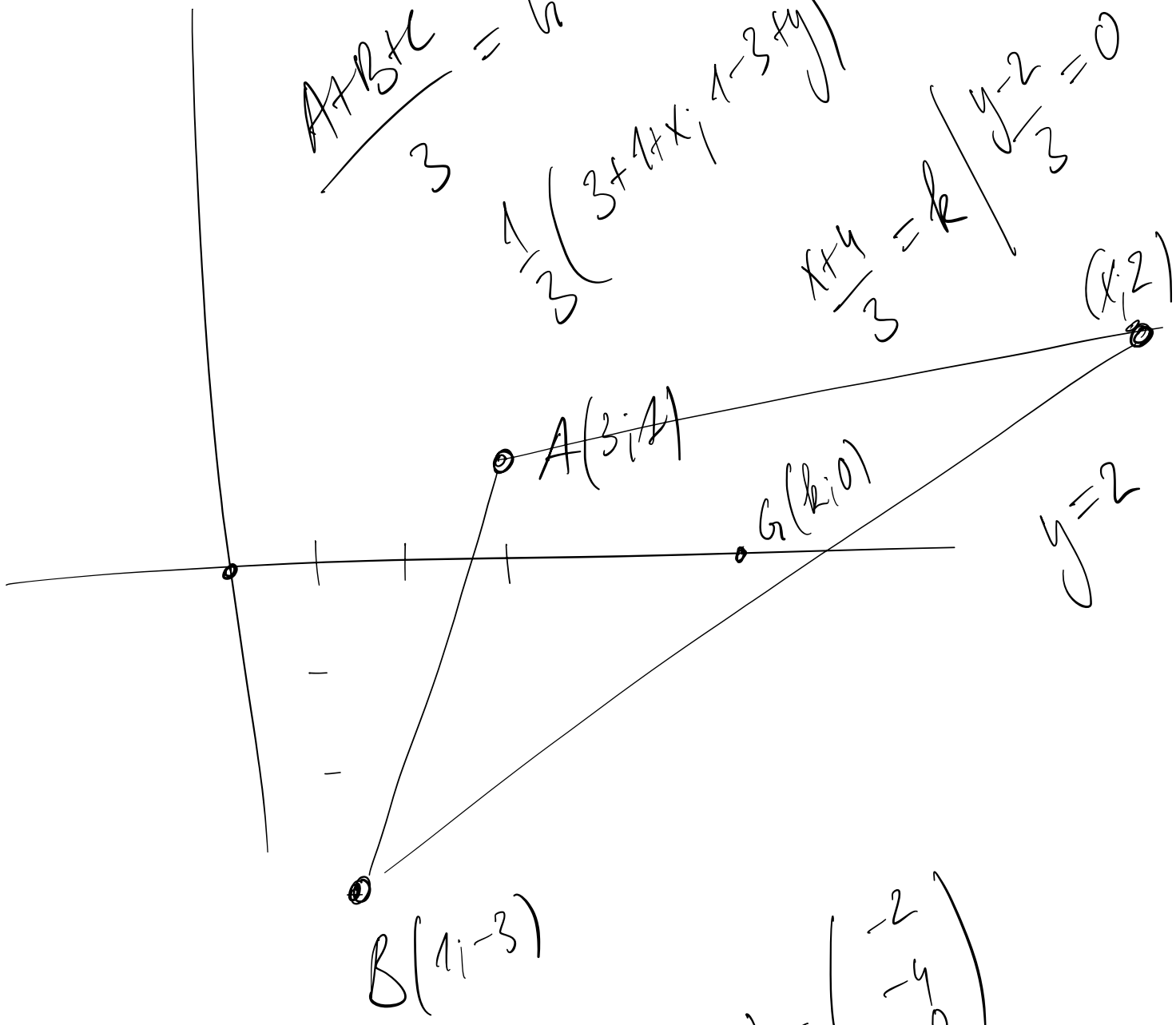
$\alpha = \overline{n}_{BDC}$ $\quad \vec{n}_\alpha = \vec{BC} \times \vec{BD}$

$\beta = \overline{n}_{ABC}$ $\quad \vec{n}_\beta = \vec{AB} \times \vec{AC}$

$\frac{A+B+C}{3} = G$

$\frac{1}{3}\begin{pmatrix} 3+1+x \\ 1-3+y \end{pmatrix} = \begin{pmatrix} k \\ 0 \end{pmatrix}$

$\frac{x+4}{3} = k \quad \left| \frac{y-2}{3} = 0 \right.$

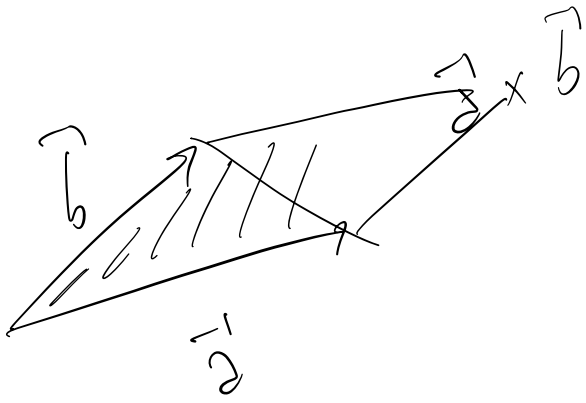


$\vec{2} = \begin{pmatrix} -2 \\ -4 \\ 0 \end{pmatrix}$

$\vec{AB} = \begin{pmatrix} -2 \\ -4 \end{pmatrix}$

$\vec{b} = \begin{pmatrix} x-3 \\ 1 \\ 0 \end{pmatrix}$

$\vec{AC} = \begin{pmatrix} x-3 \\ 1 \end{pmatrix}$

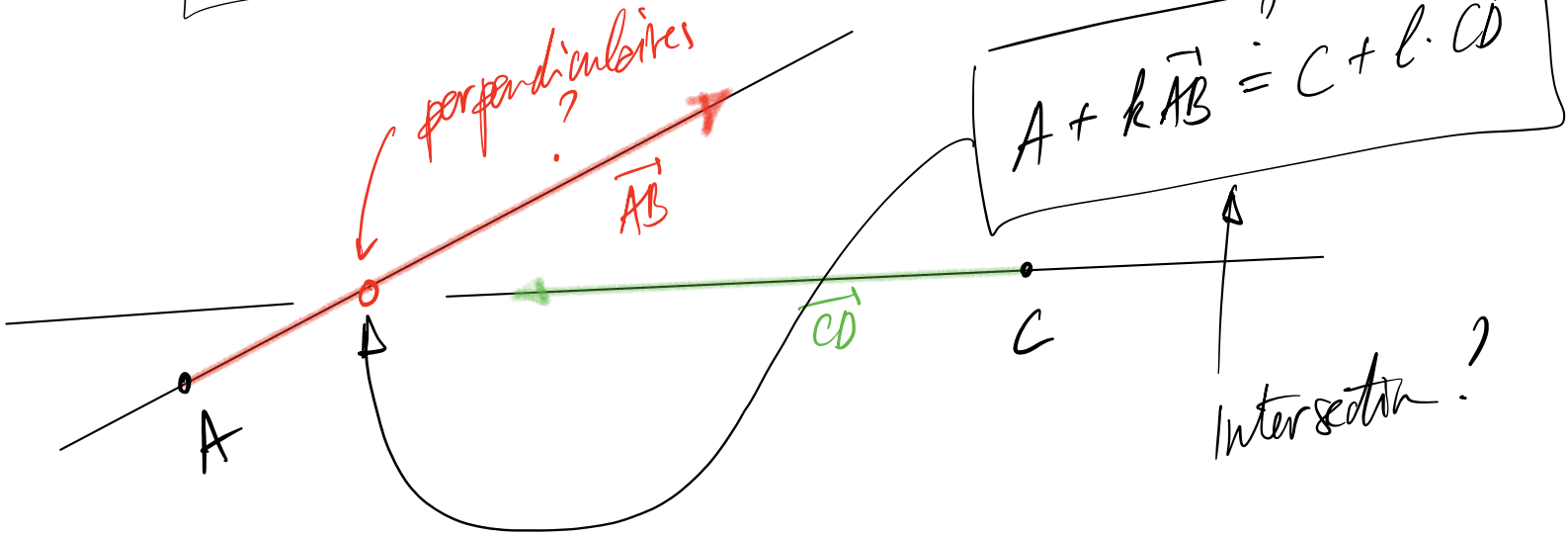

$\vec{a} \times \vec{b}$
$\vec{b}$
$\vec{a}$

2) $A(8;-1;3)$ $B(11;11;5)$ $C(4;1;-1)$ $D(6;0;2)$

$$\vec{AB} = \begin{pmatrix} 3 \\ 12 \\ 2 \end{pmatrix} \qquad \vec{CD} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}$$

$\vec{AB} \cdot \vec{CD} = 0$? $\quad 6 - 12 + 6 = 0$ ✓

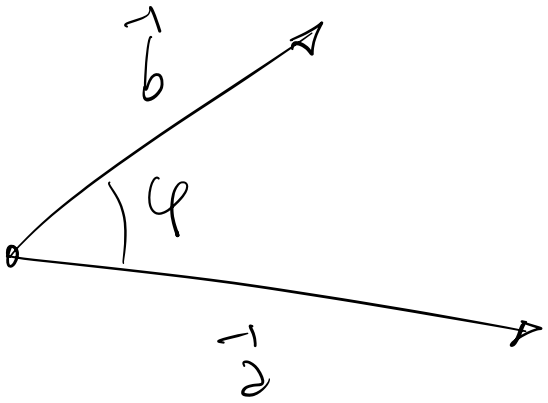
$\Rightarrow \vec{AB} \perp \vec{CD}$ $\Rightarrow$ d_{AB} et d_{CD} sont orthogonales.



$A + k\vec{AB} \overset{?}{=} C + \ell \cdot \vec{CD}$

Intersection ?

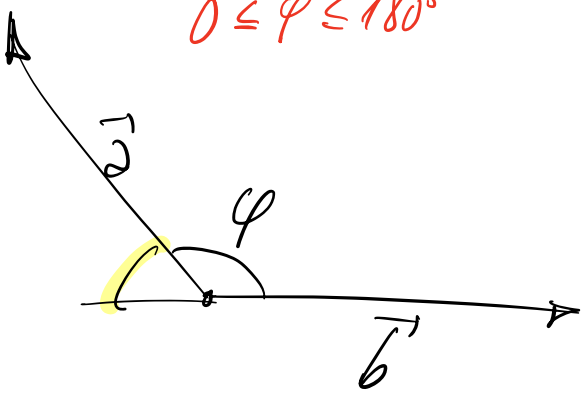
Angle entre 2 vecteurs



$$\cos\varphi = \frac{\vec{a}\cdot\vec{b}}{\|\vec{a}\|\,\|\vec{b}\|}$$

Cas général

$0° \le \varphi \le 180°$



Angle signé

$$\cos\varphi = \frac{|\vec{a}\cdot\vec{b}|}{\|\vec{a}\|\cdot\|\vec{b}\|}$$

dans $\mathbb{R}^2$ et $\mathbb{R}^3$

$$\sin\varphi = \frac{\|\vec{a}\times\vec{b}\|}{\|\vec{a}\|\,\|\vec{b}\|}$$

dans $\mathbb{R}^3$