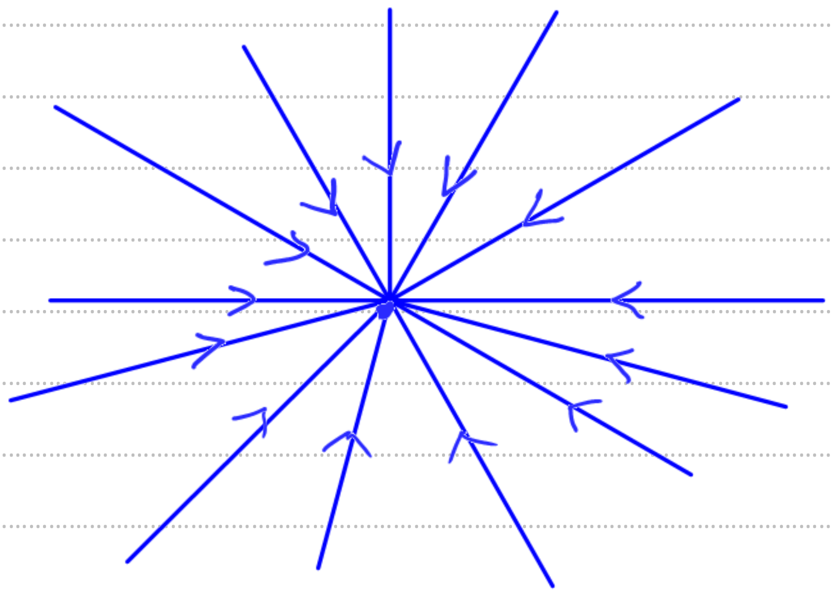
Correction

1°/ * $Q = -6{,}4\,nC < 0$: il y a un gain d'électrons

* $n = \frac{|Q|}{e} = \frac{6{,}4 \cdot 10^{-9}}{1{,}6 \cdot 10^{-19}}$

$\Rightarrow n = 4 \cdot 10^{10}$ électrons

2°/ $Q < 0$



3°/ $\vec{E}(M) = K \cdot \frac{Q}{d^2} \vec{\imath}$

$$\|\vec{E}(M)\| = \frac{K \cdot |Q|}{d^2}$$

$\underline{\underline{AN}}$: $\|\vec{E}(M)\| = \frac{9 \times 10^{9} \times 6{,}4 \times 10^{-9}}{(0{,}08)^2}$

$$\|\vec{E}(M)\| = \frac{9 \times 6{,}4}{64 \cdot 10^{-4}} = 9 \cdot 10^{3}\, N.C^{-1}$$

<u>Remarque</u>

$$\vec{F} = q \cdot \vec{E}$$

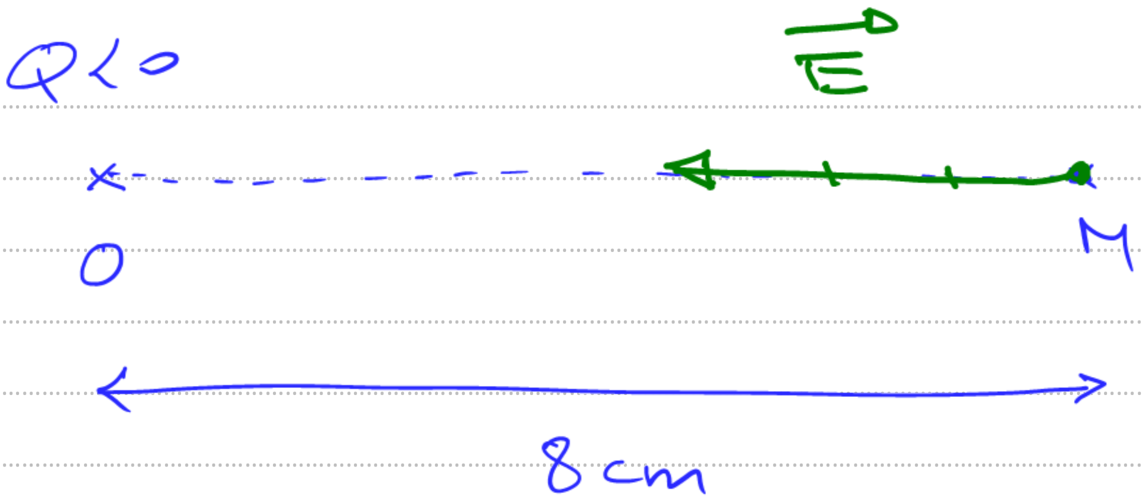
$$\Rightarrow \vec{E} = \frac{\vec{F}}{q}$$

$$\Rightarrow \boxed{\|\vec{E}\| = \frac{\|\vec{F}\|}{|q|}}$$

(N)

(C)

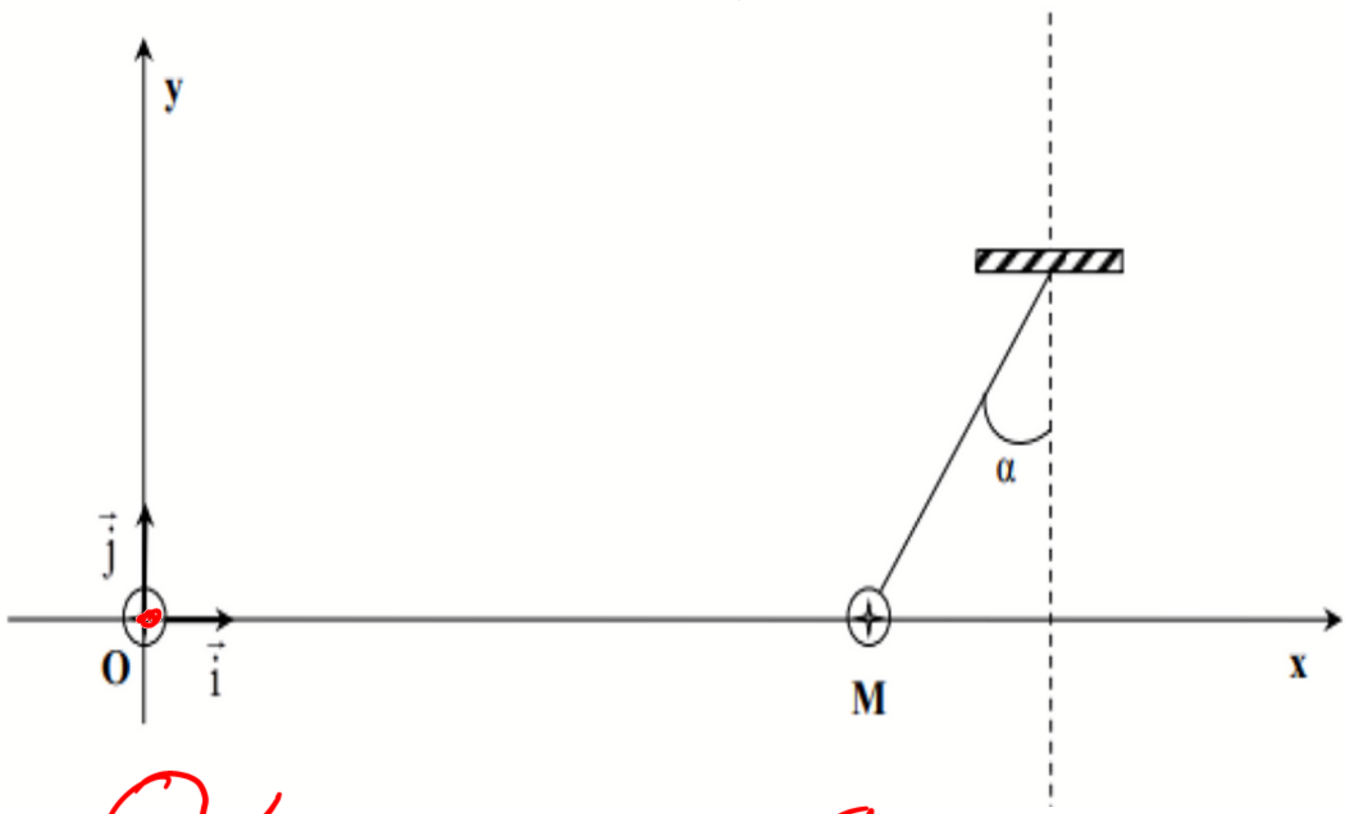
$N.C^{-1}$



$\|\vec{E}\| = 9.10^{3}\ N.C^{-1} \longrightarrow 3\ cm$

$3.10^{3}\ N.C^{-1} \longrightarrow 1\ cm$

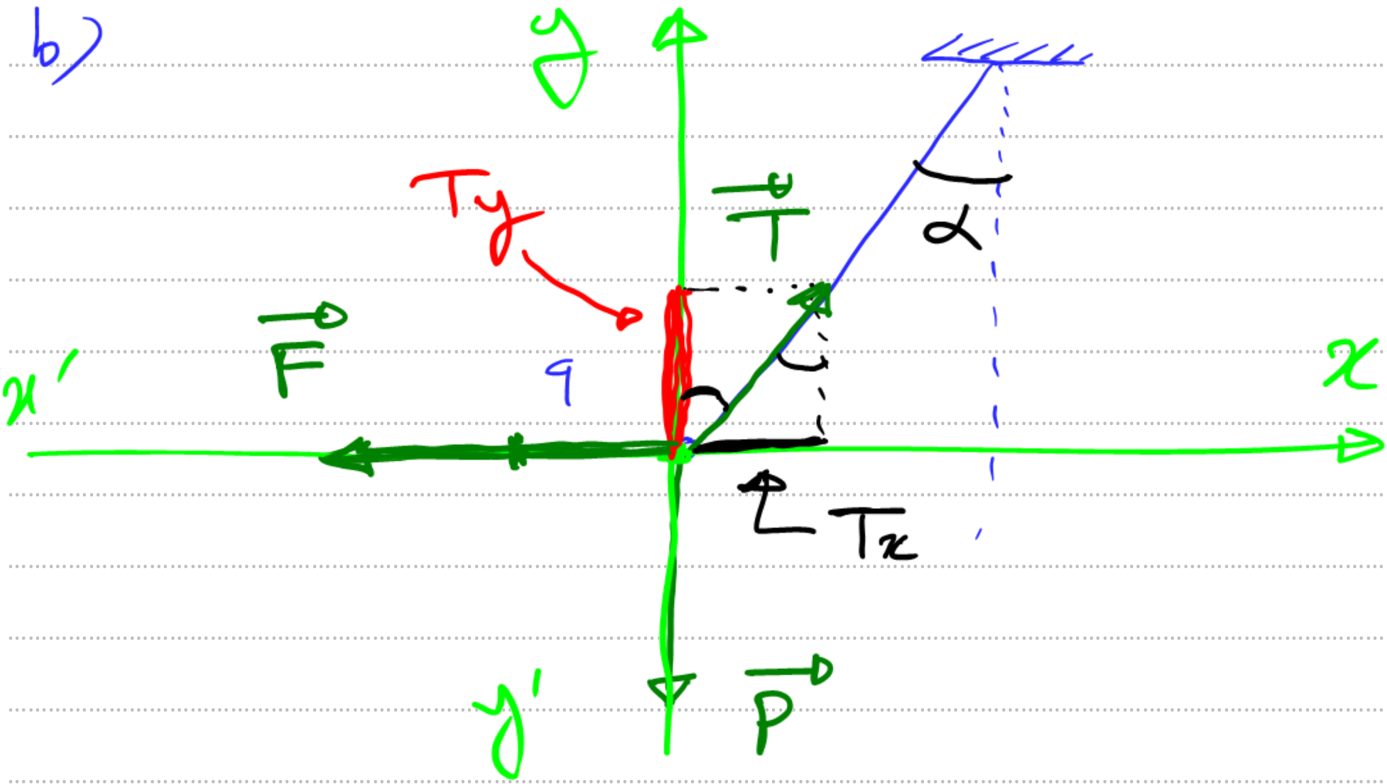
4°/ a)



$Q<0$ $\quad$ q

Entre Q et q il y a une attraction $\Rightarrow$ Q et q ont des charges de signes contraires et $Q < 0$ donc $q > 0$

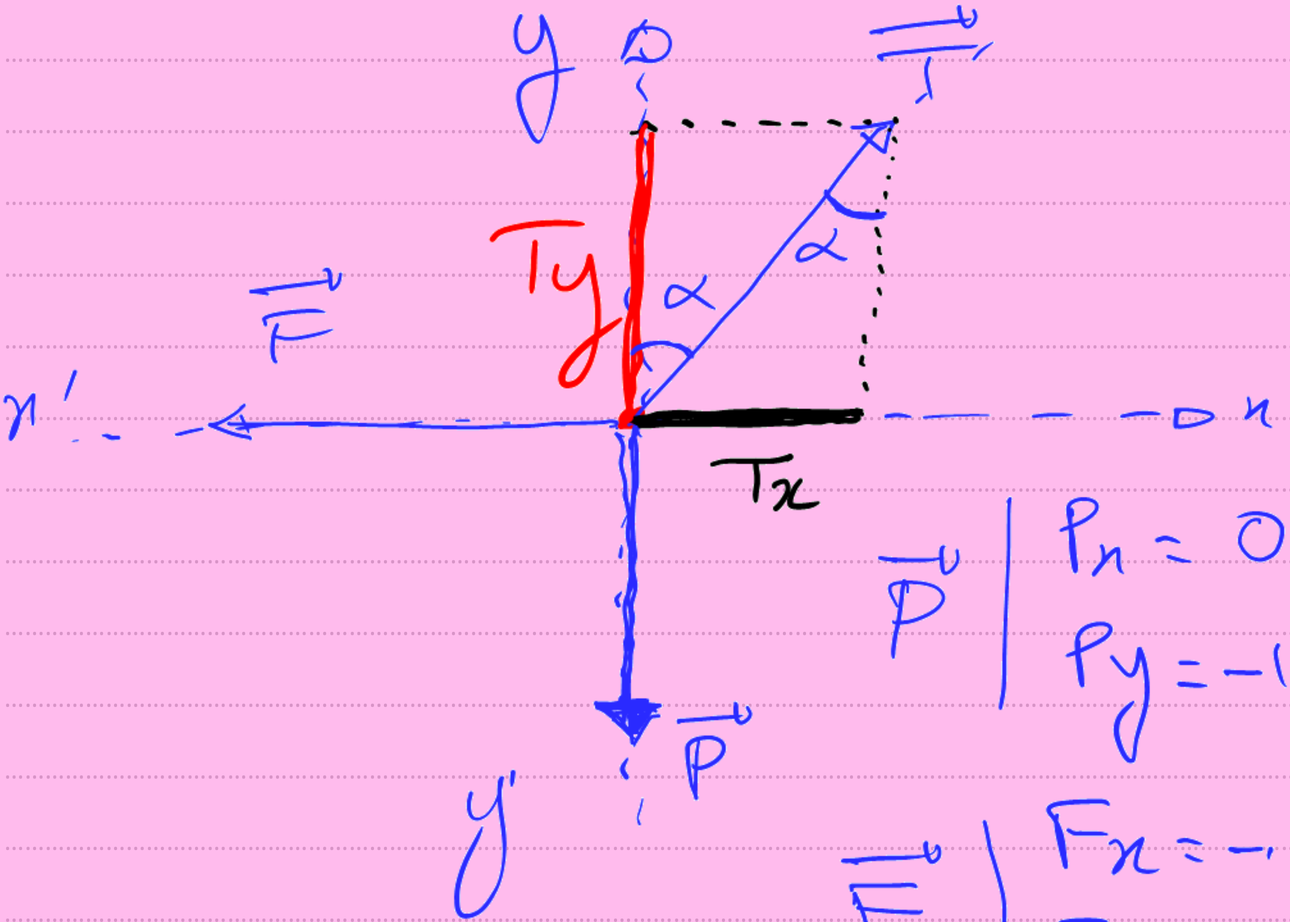
b)



La charge q est soumise à 3 forces $\vec{P}$; $\vec{F}$ et $\vec{T}$ et elle est en équilibre $\Rightarrow \vec{P} + \vec{F} + \vec{T} = \vec{0}$

$$\Rightarrow \begin{cases} P_x + F_x + T_x = 0 \\ P_y + F_y + T_y = 0 \end{cases}$$

$$\Rightarrow \begin{cases} 0 \; - \|\vec{F}\| + \|\vec{T}\| \sin\alpha = 0 \\ -\|\vec{P}\| + 0 + \|\vec{T}\| \cdot \cos\alpha = 0 \end{cases}$$



$$\vec{P} \begin{cases} P_x = 0 \\ P_y = -\|\vec{P}\| \end{cases}$$

$$\vec{F} \begin{cases} F_x = -\|\vec{F}\| \\ F_y = 0 \end{cases}$$

$$\vec{T} \begin{cases} T_x = \|\vec{T}\| \cdot \sin\alpha \\ T_y = \|\vec{T}\| \cdot \cos\alpha \end{cases}$$

$$\begin{cases} 0 - \|\vec{F}\| + \|\vec{T}\| \sin\alpha = 0 \\ -\|\vec{P}\| + 0 + \|\vec{T}\| \cdot \cos\alpha = 0 \end{cases}$$

$$\Rightarrow \begin{cases} \|\vec{T}\| \cdot \sin\alpha = \|\vec{F}\| & (1) \\ \|\vec{T}\| \cdot \cos\alpha = \|\vec{P}\| & (2) \end{cases}$$

$\frac{(1)}{(2)}$ donne

$$\frac{\cancel{\|\vec{T}\|} \cdot \sin\alpha}{\cancel{\|\vec{T}\|} \cdot \cos\alpha} = \frac{\|\vec{F}\|}{\|\vec{P}\|}$$

$$\Rightarrow \operatorname{tang}(\alpha) = \frac{\|\vec{F}\|}{\|\vec{P}\|}$$

$$\Rightarrow \|\vec{F}\| = \|\vec{P}\| \cdot \operatorname{tang}(\alpha)$$

$$\Rightarrow \boxed{\|\vec{F}\| = m \cdot \|\vec{g}\| \cdot \operatorname{tang}(\alpha)}$$

AN :

$$\|\vec{F}\| = 16 \times \underbrace{10^{-3}}_{m} \times \underbrace{10^{-3}}_{g} \times 9{,}8 \times \operatorname{tang}(30^\circ)$$

soit $\|\vec{F}\| \simeq 9.10^{-5}\ N$ (2 cm)

$$4,5.10^{-5}\ N \rightarrow 1\text{cm}$$

c) $\vec{F} = q.\vec{E}$

$\Rightarrow \|\vec{F}\| = |q|.\|\vec{E}\|$

$\Rightarrow |q| = \dfrac{\|\vec{F}\|}{\|\vec{E}\|}$

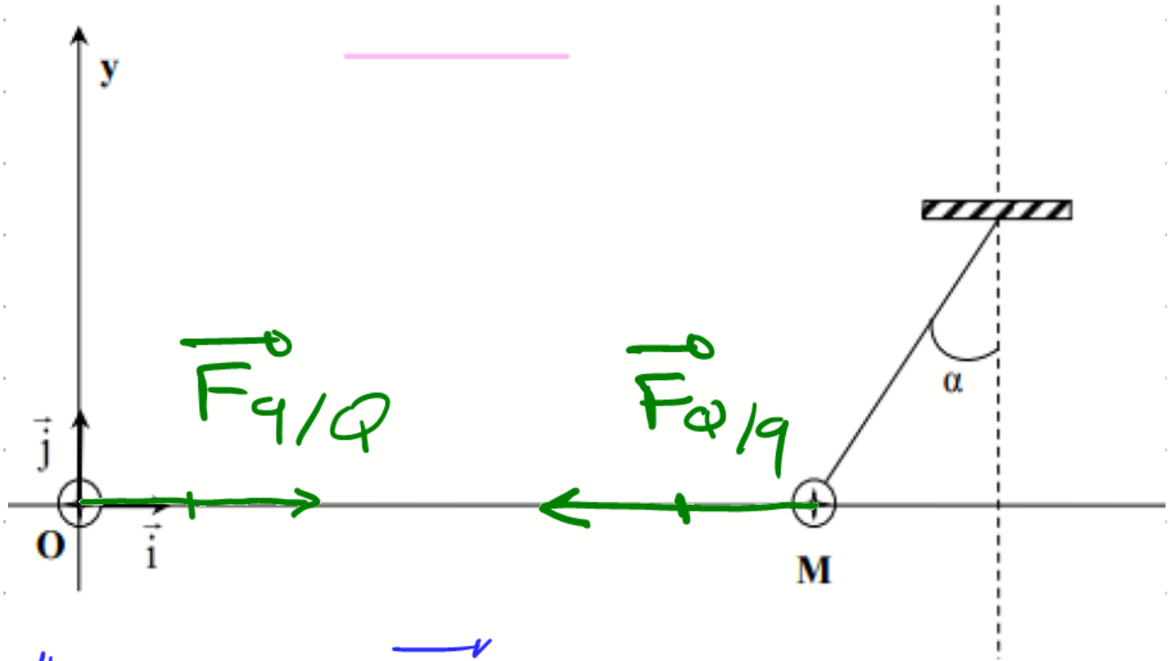
AN : $|q| = \dfrac{\cancel{9}.10^{-5}}{\cancel{9}.10^{3}} = 10^{-8}\ C$

or $q > 0 \Rightarrow q = 10^{-8}\ C$

ou $q = 10.10^{-9}\ C$

$\Rightarrow$ $q = 10\ nC$

$10^{-8} = 10 \times 10^{-9}$



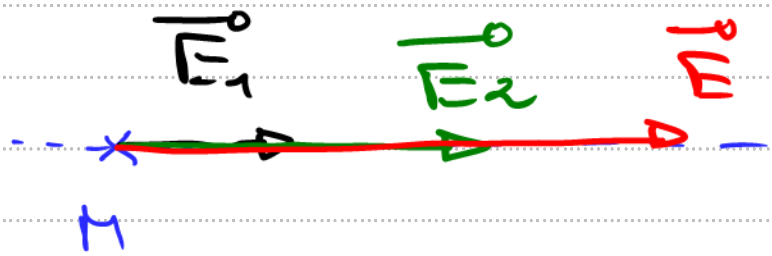
$\vec{F}_{Q/q} + \vec{F}_{q/Q} = \vec{0}$

$\vec{F}_{Q/q}$ et $\vec{F}_{q/Q}$ sont directement opposées

Champ éléctrique crée par 2 charges ponctuelles

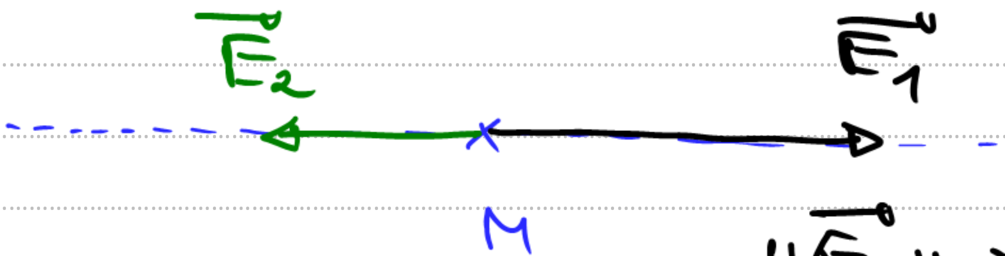
$$\vec{E} = \vec{E}_1 + \vec{E}_2$$

* 1er cas : $\vec{E}_1$ et $\vec{E}_2$ sont colinéaires et de même sens



$$\|\vec{E}\| = \|\vec{E}_1\| + \|\vec{E}_2\|$$

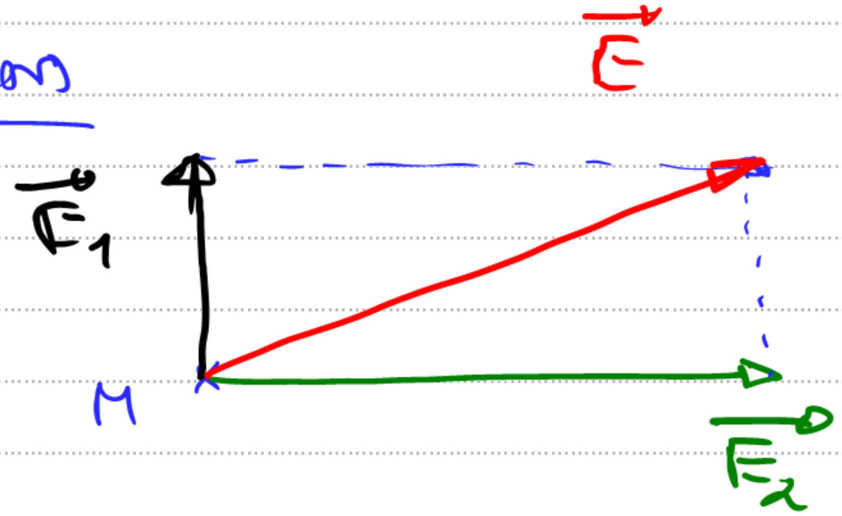
* 2ème cas : $\vec{E}_1$ et $\vec{E}_2$ sont colinéaires et de sens contraires



$$\|\vec{E}_1\| > \|\vec{E}_2\|$$

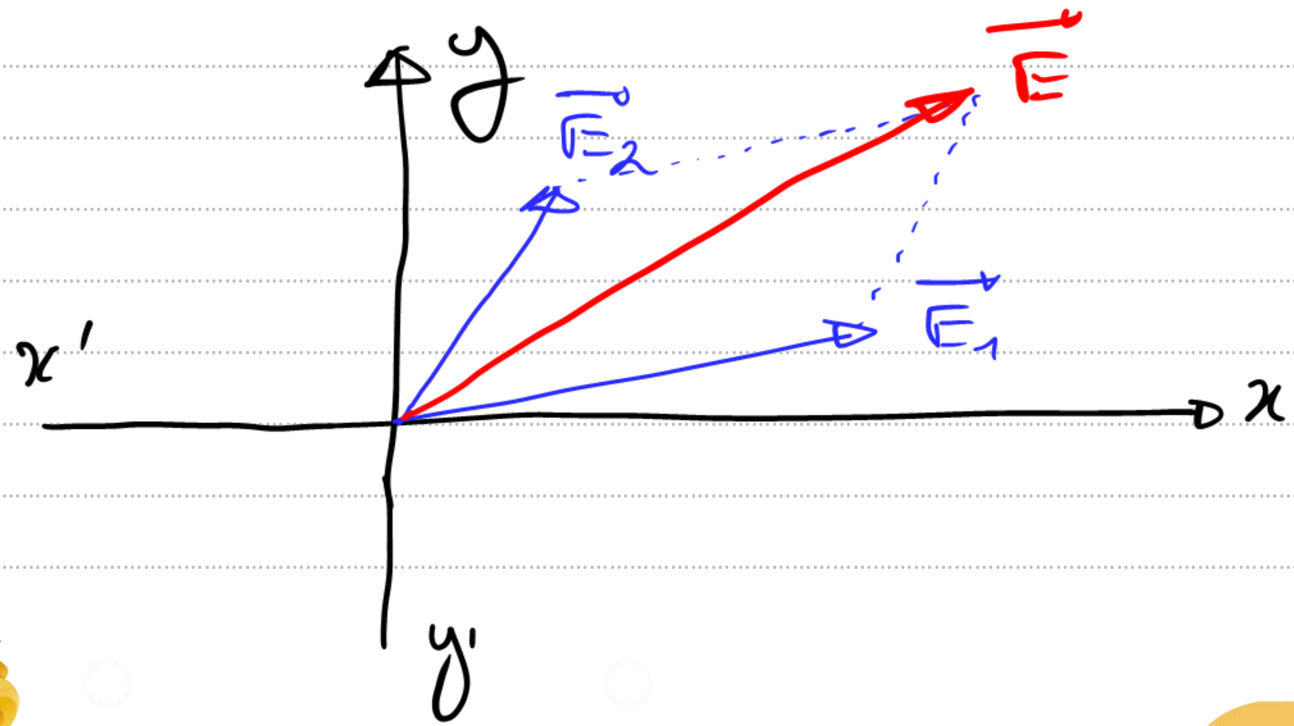
$$\|\vec{E}\| = \|\vec{E}_1\| - \|\vec{E}_2\|$$

3ème cas



$$\|\vec{E}\| = \sqrt{\|\vec{E}_1\|^2 + \|\vec{E}_2\|^2}$$

Généralement :



$$\vec{E}\begin{cases} E_x = E_{1x} + E_{2x} \\ E_y = E_{1y} + E_{2y} \end{cases}$$

$$\|\vec{E}\| = \sqrt{E_x^2 + E_y^2}$$