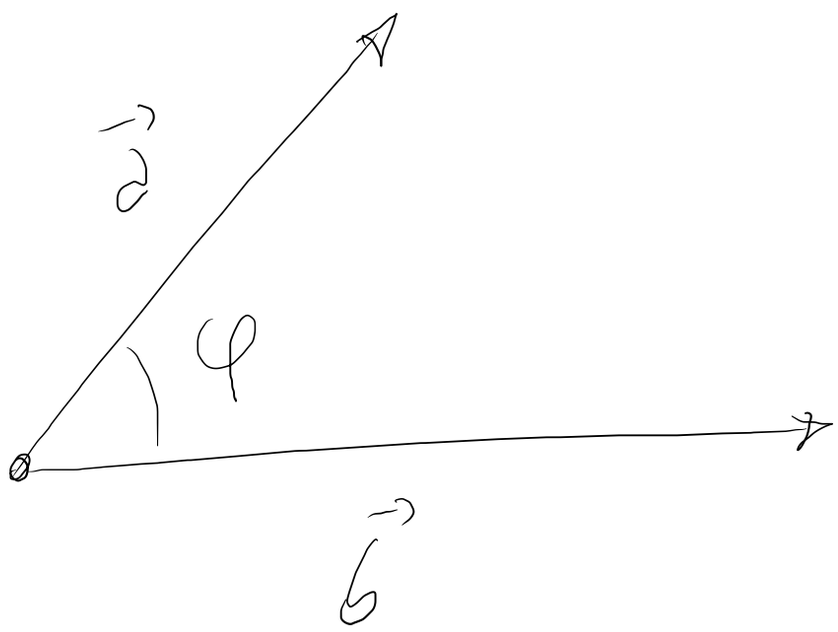
Produkt salaire et angles

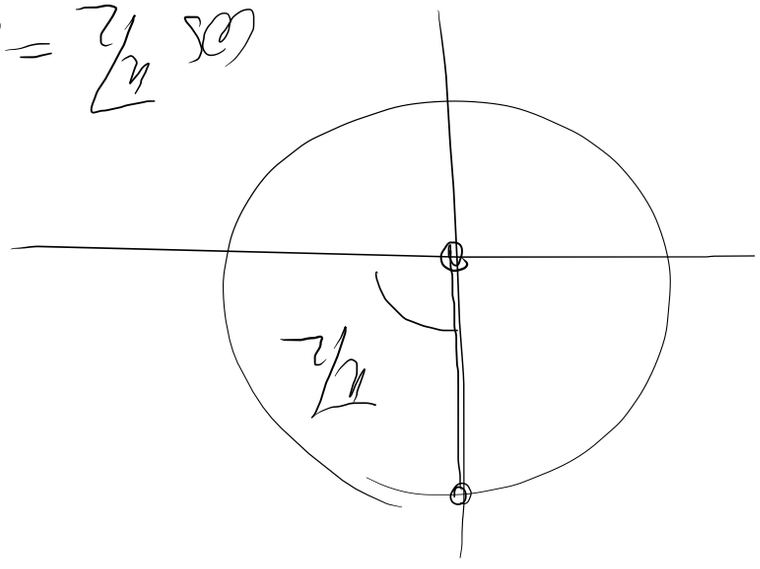


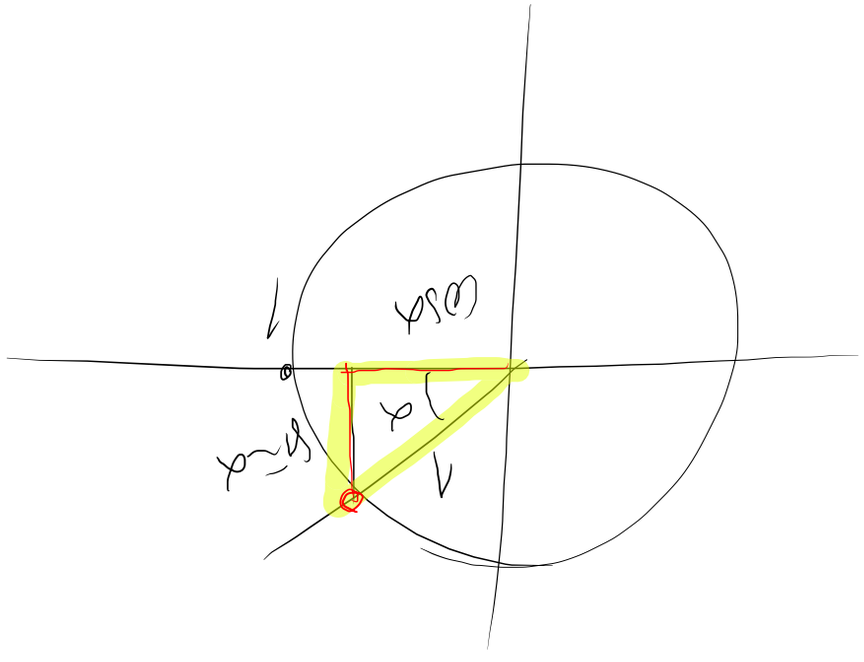
$$\cos\varphi = \frac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \cdot \|\vec{b}\|}$$

$$\vec{a} \cdot \vec{b} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} \cdot \begin{pmatrix} b_1 \\ b_2 \end{pmatrix} \overset{\text{def}}{=} a_1 \cdot b_1 + a_2 \cdot b_2$$

$$0 = \underline{q} \cdot \underline{\varepsilon} \quad \Leftrightarrow \quad \underline{q} \perp \underline{\varepsilon}$$

$0 = \gamma_h \cos(\varphi)$

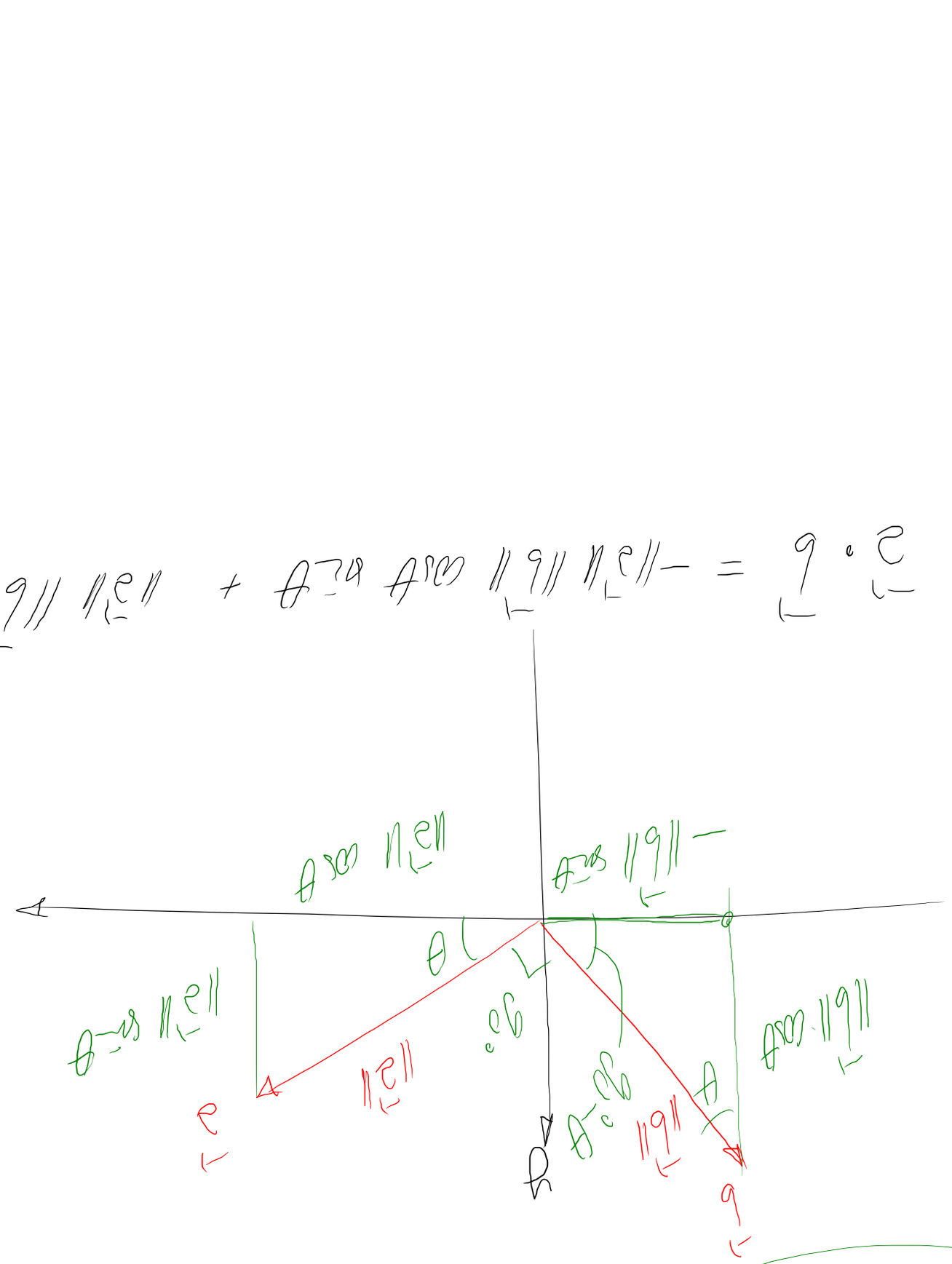




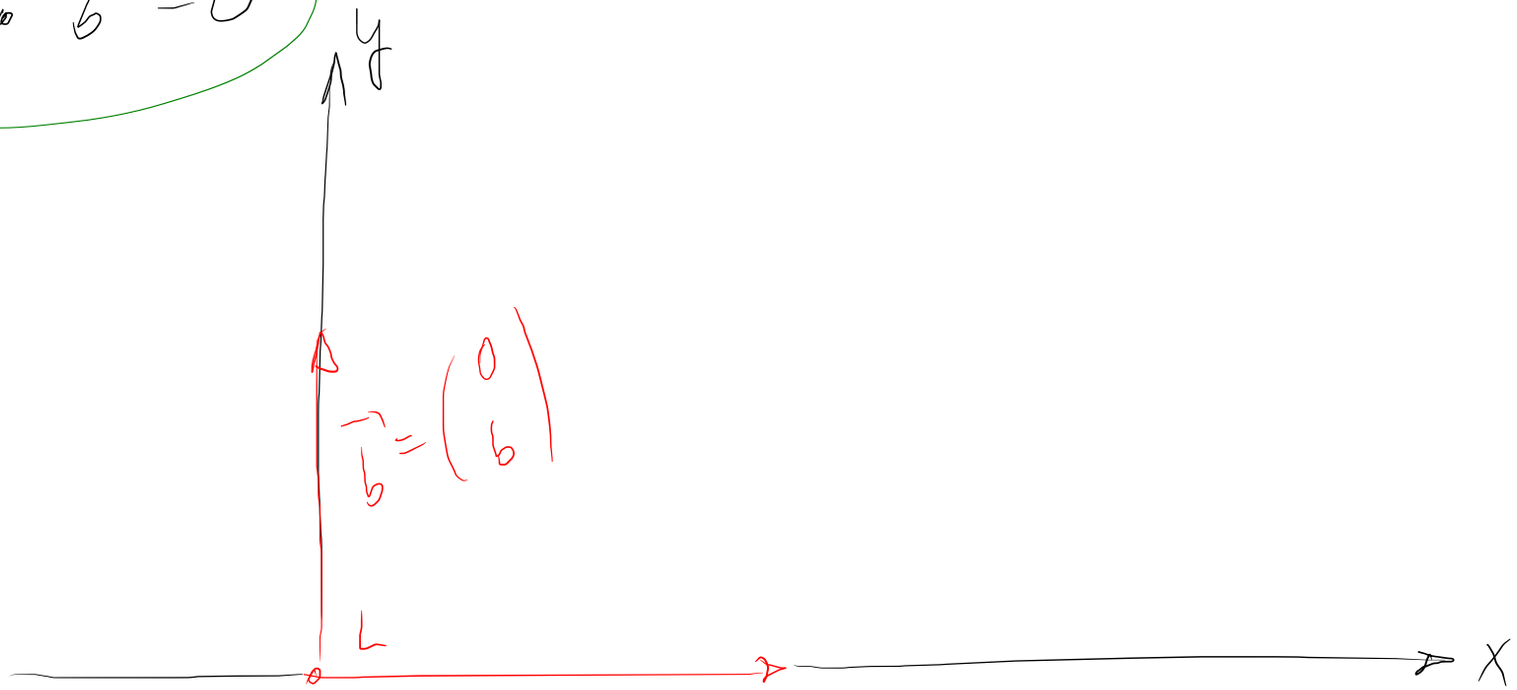
$$\vec{a} \cdot \vec{b} = -\|\vec{a}\| \|\vec{b}\| \cos\theta \, \hat{\theta} + \|\vec{a}\| \|\vec{b}\| \hat{\theta} \cos\theta = 0$$

$$\begin{pmatrix} \cos\theta \, \|\vec{a}\| \\ \hat{\theta} \, \|\vec{a}\| \end{pmatrix} = \vec{a} \qquad \begin{pmatrix} \hat{\theta} \cdot \|\vec{a}\| \\ \cos\theta \cdot \|\vec{a}\| \end{pmatrix} = \vec{a}$$

$$\frac{\|\vec{a}\|}{d\theta} = \hat{\theta}$$



$\vec{a} \cdot \vec{b} = 0$



$\vec{b} = \begin{pmatrix} 0 \\ b \end{pmatrix}$

$\vec{a} = \begin{pmatrix} a \\ 0 \end{pmatrix}$

Soit $\vec{b} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$

$\vec{a} \cdot \vec{b} = \begin{pmatrix} a \\ 0 \end{pmatrix} \cdot \begin{pmatrix} b_1 \\ b_2 \end{pmatrix} = \boxed{a b_1 = 0}$

$a = 0$ ou $b_1 = 0 \Rightarrow \vec{b} = \begin{pmatrix} 0 \\ b \end{pmatrix}$

$a = 0$ absurde

$\Rightarrow \vec{a} \perp \vec{b}$