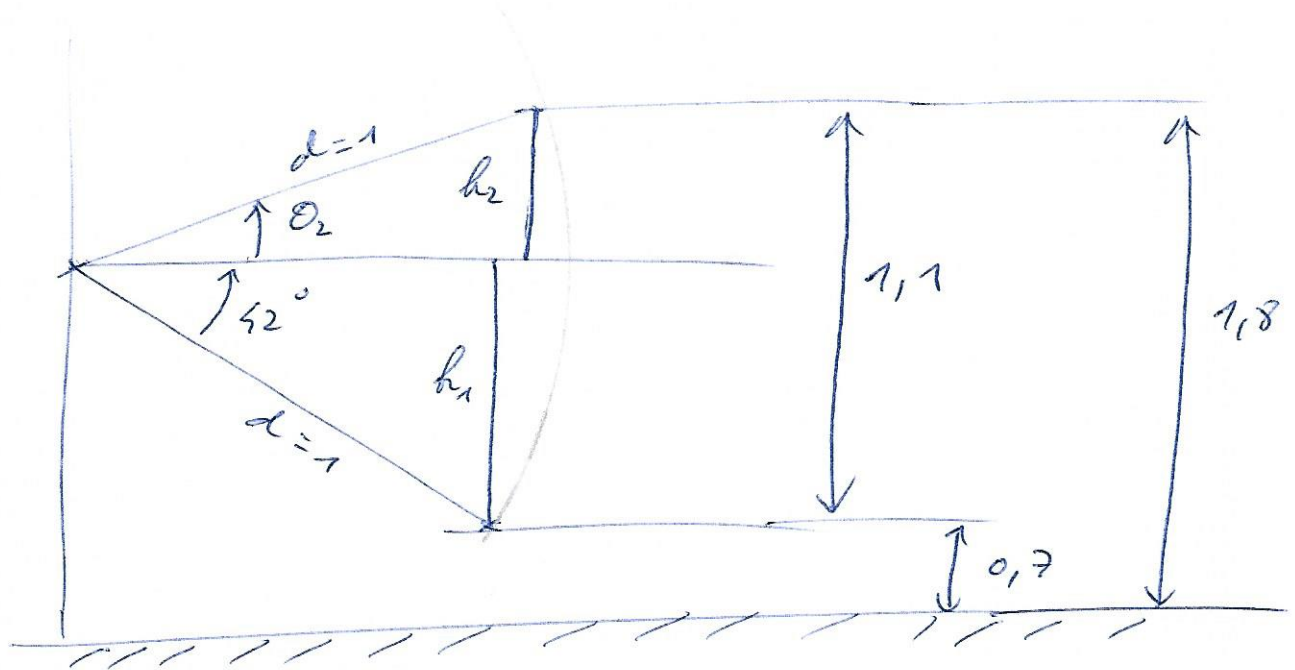


①

Coffre motorisé!

Q1



Ce schéma fait apparaître 2 triangles

$$\sin 42 = \frac{h_1}{d} \Rightarrow h_1 = 0,67 \text{ m}$$

$$\text{Il faut } h_2 = 0,53 \text{ m, } \sin \theta_2 = \frac{h_2}{d} \Rightarrow \theta_2 = 25,5^\circ$$

Q2) Fermeture géométrique : $\vec{AB} = \vec{AC} + \vec{CB}$

$$-a \vec{x}_0 + b \vec{y}_0 = L \vec{x}_v - c \vec{x}_p$$

$$\vec{x}_p = \cos \theta \vec{x}_0 + \sin \theta \vec{y}_0$$

$$\vec{x}_v = \cos \alpha \vec{x}_0 + \sin \alpha \vec{y}_0$$



$$\Rightarrow \begin{cases} -a \cos \alpha = L \cos \alpha - c \cos \theta \\ b = L \sin \alpha - c \sin \theta \end{cases}$$

$$\Rightarrow \begin{cases} L \cos \alpha = c \cos \theta - a \\ L \sin \alpha = b + c \sin \theta \end{cases}$$

$$L^2 = \dots$$

2

Q3

$$L = \sqrt{(c \cdot 60 - a)^2 + (l + c \cdot m \cdot \theta)^2}$$

$$\theta = 0 \Rightarrow L_{\min} =$$

$$\theta = 67,5^\circ \Rightarrow L_{\max} =$$

$$L_{\max} - L_{\min}$$

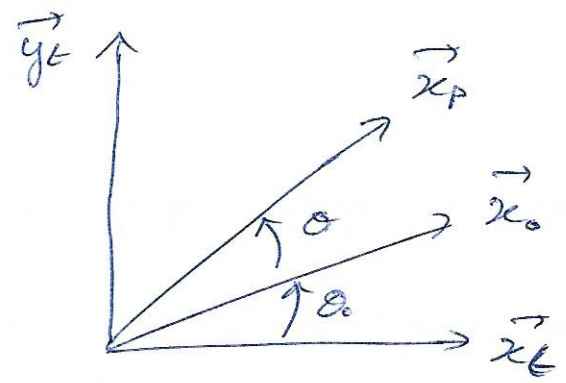
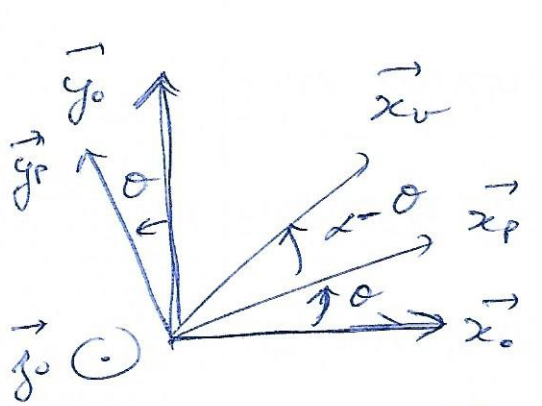
Q4 On vole le vélin, solide soumis à 2 forces ...

$$\Rightarrow \vec{F}_{\text{rés}} = F \cdot \vec{x}_v$$

On vole le coffre, on écrit le TMS en B \Rightarrow

$$\vec{BC} \wedge F \cdot \vec{x}_v + \vec{BG} \wedge (-mg \vec{y}_e) = \vec{0}$$

$$c \cdot \vec{x}_p \wedge F \cdot \vec{x}_v + \lambda \vec{x}_p \wedge (-mg \cdot \vec{y}_e) = \vec{0}$$



$$\vec{x}_v = G(\alpha - \theta) \vec{x}_p + m \sin(\alpha - \theta) \vec{y}_p$$

$$\vec{x}_p = G(\theta + \theta_0) \vec{x}_e + m(\theta + \theta_0) \vec{y}_e$$

$$c \cdot F \cdot \sin(\alpha - \theta) - \lambda mg G(\theta + \theta_0) = 0$$

$$\Rightarrow F = \frac{mg \cdot \lambda \cdot G(\theta + \theta_0)}{c \cdot m(\alpha - \theta)}$$

action des 2 vélius

Rem: $\theta_0 = -62^\circ$
(avec)