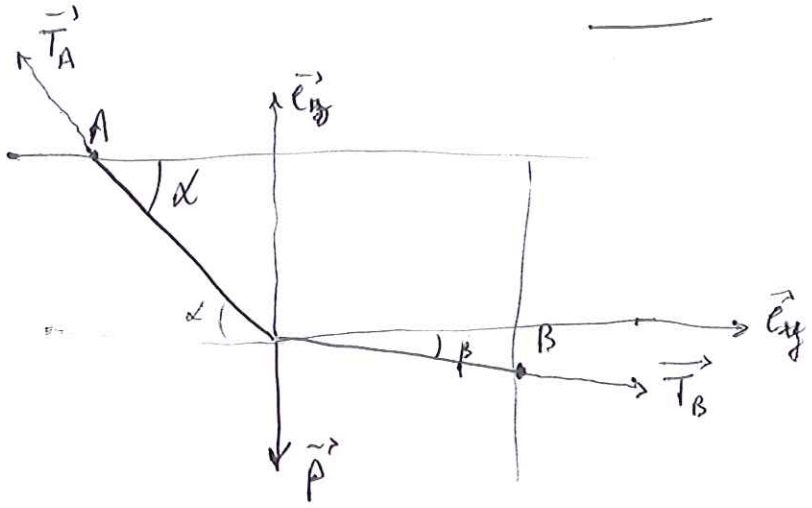
Juin 2025

1)



$$\vec{T_A} + \vec{T_B} + \vec{P} = \vec{0}$$

$$\begin{vmatrix} -T_A \cos\alpha \\ T_A \sin\alpha \end{vmatrix} + \begin{vmatrix} +T_B \cos\beta \\ -T_B \sin\beta \end{vmatrix} + \begin{vmatrix} 0 \\ -mg \end{vmatrix} = \begin{vmatrix} 0 \\ 0 \end{vmatrix} \quad \text{sur} \quad \begin{vmatrix} e_y \\ e_z \end{vmatrix}$$

$$T_A = \frac{+T_B}{\cos\alpha}\cos\beta \qquad T_B = \frac{+T_A\cos\alpha}{\cos\beta}$$

$$T_A \sin\alpha \mp \frac{T_A\cos\alpha}{\cos\beta}\sin\beta = mg$$

$$T_A = \frac{mg}{\sin\alpha \mp \cos\alpha \tan\beta}$$

$$T_B = \frac{+mg}{\sin\alpha \mp \cos\alpha \tan\beta} \cdot \frac{\cos\alpha}{\cos\beta} = +mg\,\frac{\cos\alpha}{\sin\alpha\cos\beta \mp \cos\alpha\sin\beta}$$

$$= \frac{+mg}{\tan\alpha\cos\beta \mp \sin\beta} = \frac{mg\cos\alpha}{\sin(\alpha-\beta)}$$

avec $\alpha = 60°$; $\beta = 30°$; $mg = 100\ N$:

$\cos\alpha = \frac{1}{2}$; $\sin\alpha = \frac{\sqrt{3}}{2}$; $\tan\alpha = \sqrt{3}$

$\cos\beta = \frac{\sqrt{3}}{2}$; $\sin\beta = \frac{1}{2}$; $\tan\beta = \frac{1}{\sqrt{3}}$

$$T_A = \frac{100}{\frac{\sqrt{3}}{2} - \frac{1}{2\sqrt{3}}} = \frac{2.100\sqrt{3}}{3-1} = 100\sqrt{3}\ N$$

$$T_B = \frac{100}{\sqrt{3}\cdot\frac{\sqrt{3}}{2} - \frac{1}{2}} = \frac{2.100}{3-1} = 100\ N$$

2) Voir TD

3) Voir cours