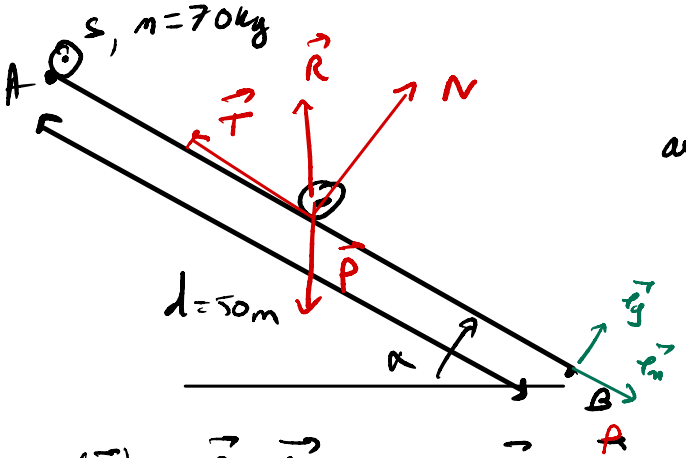
TD n5 – Exercice 4

1



$T = \mu N$

avec $T = \|\vec{T}\|$ et $N = \|\vec{N}\|$

2 • $W_{AB}(\vec{P}) = \vec{P} \cdot \vec{AB} = m\vec{g} \cdot \vec{AB}$

$W_{AB}(\vec{P}) = mg\, d \cos\left(\frac{\pi}{2} - \alpha\right) = mg\, d \sin(\alpha)$

A.N. $W_{AB}(\vec{P}) = 1{,}5 \times 10^5$ J

• $W_{AB}(\vec{N}) = \vec{N} \cdot \vec{AB} = 0$ car $\vec{N} \perp \vec{AB}$

• $W_{AB}(\vec{T}) = \vec{T} \cdot \vec{AB} = -\mu N d$

PFD p/r $\vec{e_y}$ $N - mg\cos(\alpha) = 0$ (pas de mvt selon $\vec{e_y}$)

d'où $N = mg\cos(\alpha)$

$W_{AB}(\vec{T}) = -\mu\, mg \cos(\alpha)\, d$

A.N. $W_{AB}(\vec{T}) = -3{,}1 \times 10^4$ J

3 $\Delta_{AB} E_c = \sum_i W_{AB}(\vec{F}_i)$

$E_{c,B} - E_{cA} =$

$\frac{1}{2} m v_B^2 - 0 = W_{AB}(\vec{P}) + W_{AB}(\vec{T})$

$= mgd\sin(\alpha) - \mu mgd\cos(\alpha)$

$v_B = \{2gd(\sin(\alpha) - \mu\cos(\alpha))\}^{1/2}$

$v_B = 18\ m.s^{-1} = 65\ km.h^{-1}$