Rampe

$\vec{R}_c = m\ddot{x}\,\vec{x_1}$

$\vec{R}_d = m\ddot{x}.\vec{x_1}$

(Q1) $\dot{x} = -R.\dot{\theta}$ Rem : $\ddot{x} = -R\ddot{\theta}$

(Q2) $\vec{T}(G,2/1) = C.\dot{\theta}\vec{z}$ (Q3) $\vec{\delta}(G,2/1) = C.\ddot{\theta}\vec{z}$

(Q4) $\vec{\delta}(A,2/1) = \vec{\delta}(G,2/1) + \vec{AG} \wedge m.\vec{\Gamma}(G,2/1)$

$= C\ddot{\theta}\vec{z} + R.\vec{y_1} \wedge m.\ddot{x}.\vec{x_1} = \left(C\ddot{\theta} - mR\ddot{x}\right)\vec{z}$

$\vec{\delta}(A,2/1) = (C + mR^2)\ddot{\theta}.\vec{z}$

(Q4) $\{\tau_{1\to 2}\} = \begin{Bmatrix} \vec{F} \\ \vec{M}(A) \end{Bmatrix} = \begin{Bmatrix} X.\vec{x_1} + Y.\vec{y_1} \\ \vec{0} \end{Bmatrix}_A$

(Q5) $\vec{P} = -mg\vec{y_0} = -mg(\cos\alpha\,\vec{y_1} - \sin\alpha\,\vec{x_1})$

$\vec{M_0}(A) = \vec{M}(G) + \vec{OG} \wedge \vec{P} = \vec{0} + R\vec{y_1} \wedge \vec{P} = -mgR\sin\alpha.\vec{z}$

PFD $\Rightarrow$

$$\begin{cases} m\ddot{x} = X + mg\sin\alpha & (1) \\ 0 = Y - mg\cos\alpha & (2) \\ (C + mR^2)\ddot{\theta} = -mgR\sin\alpha & (3) \end{cases}$$

$\Rightarrow$ (1) $\Rightarrow$ $\ddot{\theta} = \dfrac{-mgR\sin\alpha}{C + mR^2}$; $\ddot{x} = \dfrac{mgR^2\sin\alpha}{C + mR^2}$

(2) $\Rightarrow$ $Y = mg.\cos\alpha$.

$\Rightarrow \dot{x} =$

$\Rightarrow x = f_{cte}(t, cte)$

(3) $\Rightarrow$

(3) $\Rightarrow$ $X = m\ddot{x} - mg\sin\alpha = \dfrac{m^2gR^2\sin\alpha}{C + mR^2} - \dfrac{mg\sin\alpha(C + mR^2)}{C + mR^2}$

$$X = \frac{-mgR\sin\alpha.C}{C + mR^2}$$

Rsg $\Rightarrow \dfrac{|X|}{|Y|} < f \Rightarrow \dfrac{C.\tan\alpha}{C + mR^2} < f$