


Récapitulation d'énergie

(Q1) $\vec{v}(A \in \mathcal{Y}_0) = d \cdot \dot{\alpha} \vec{y}_1$

(Q2) $\vec{v}(G \in \mathcal{Y}_0) = d \dot{\alpha} \vec{y}_1 + \cancel{L \dot{\theta} \vec{y}_2} + L(\dot{\theta} + \dot{\alpha}) \vec{y}_2$

$$\begin{aligned} \vec{v}(G \in \mathcal{Y}_0) &= \vec{v}(A \in \mathcal{Y}_0) + \vec{GA} \wedge \vec{\Omega}_{\mathcal{Y}_0} \\ &= d \dot{\alpha} \vec{y}_1 + (\dot{\alpha} + \dot{\theta}) \vec{z} \wedge L \vec{x}_2 \end{aligned}$$

(Q3) $\vec{T}(A, \mathcal{Y}_0) = J(\ddot{\theta} + \ddot{\alpha}) + m_2 \vec{AG} \wedge \vec{v}(A \in \mathcal{Y}_0)$
 $= \dots + m_2 L \vec{x}_2 \wedge d \dot{\alpha} \vec{y}_1$
 $= J(\ddot{\theta} + \ddot{\alpha}) \vec{z} + m_2 L d \dot{\alpha} \cos \theta \vec{z}$
 $= [J(\ddot{\theta} + \ddot{\alpha}) + m_2 L d \dot{\alpha} \cos \theta] \vec{z}$



(Q4) $\vec{S}(A, \mathcal{Y}_0) = [J(\ddot{\theta} + \ddot{\alpha}) + m_2 L d (\dot{\alpha} \cos \theta - \dot{\alpha} \sin \theta)] \vec{z}$
 $+ \frac{\vec{v}(A/R) \wedge m_2 \cdot \vec{v}(G \in \mathcal{Y}_0)}{d \dot{\alpha} \vec{y}_1 \wedge m_2 [d \dot{\alpha} \vec{y}_1 + L(\dot{\theta} + \dot{\alpha}) \vec{y}_2]}$
 $m_2 d \dot{\alpha} L (\dot{\theta} + \dot{\alpha}) \sin \theta \vec{z}$
 $\vec{S}(A, \mathcal{Y}_0) = [J(\ddot{\theta} + \ddot{\alpha}) + m_2 L d (\dot{\alpha} \cos \theta + \dot{\alpha}^2 \sin \theta)] \vec{z}$

(Q5) $\vec{\Gamma}(A) = \vec{\Gamma}(G) + \vec{AG} \wedge \vec{P}$
 $= \vec{0} + L \vec{x}_2 \wedge (+m_2 g \vec{x}_0) = -m_2 L g (\vec{x}_0 \wedge \vec{x}_2)$
 $= -m_2 g L m (\lambda + \theta) \vec{z}$
 $\vec{c}_2 = -\lambda \dot{\theta} \vec{z}$

(Q6) $[J(\ddot{\theta} + \ddot{\alpha}) + m_2 L d (\dot{\alpha} \cos \theta + \dot{\alpha}^2 \sin \theta) = -m_2 g L m (\lambda + \theta) \vec{z} - \lambda \dot{\theta} \vec{z}]$

(Q7) Linéariser : $\dot{\theta} + \theta = \theta$; $\cos \theta = 1$, $m (\lambda + \theta) = \lambda + \theta$, $\dot{\alpha}^2 = 0$
 $J \ddot{\theta} + \lambda \dot{\theta} + m_2 g L \theta = -J \ddot{\alpha} - m_2 L d \dot{\alpha} - m_2 g L \alpha$