Stabilisation

Q1 Stable si $m_{cp} L_{cp} > m_c L_c$ (si ...

Q2 $\vec{\delta}(G_c, m_c/0) = \vec{0}$ (masse ponctuelle)

$\vec{\delta}(0, m_c/0) = \vec{\delta}(G_c, m_c/0) + \vec{OG_c} \wedge m_c \vec{a}(G_c, m_c/0)$ (BABAR)

$\vec{v}(G_c, m_c/0) = \vec{v}(0, 2/0) + \vec{\Omega}^2/_0 \wedge \vec{OG_c}$ BARAB, $2 = m_c + m_{cp}$

$= \dot{x}\vec{x_0} + \dot{\varphi}\vec{y_2} \wedge L_c \vec{z_2} = \dot{x}\vec{x_0} + L_c \dot{\varphi} . \vec{x_2}$

$\vec{a}(G_c, m_c/0) = \ddot{x}\vec{x_0} + L_c \ddot{\varphi}\vec{x_2} - L_2 \dot{\varphi}^2 . \vec{z_2}$

$\vec{OG_c} = L_c \vec{z_2}$ $\quad\quad \vec{z_2} = + \sin\varphi \, \vec{x_0} + \cos\varphi \, \vec{z_0}$

$\Longrightarrow \vec{\delta}(0, m_c/0) = m_c L_c (\ddot{x} . \cos\varphi + L_c \ddot{\varphi}) \vec{y_2}$

Même calcul pour $\vec{\delta}(0, m_{cp}/0)$

$\Longrightarrow \vec{\delta}(0, m_{cp}/0) = m_{cp} L_{cp} (-\ddot{x}\cos\varphi + L_{cp} \ddot{\varphi}) \vec{y_2}$

On isole (2), TMD en O

$(m_c L_c - m_{cp} L_{cp}) \ddot{x} . \cos\varphi + (m_c L_c^2 + m_{cp} L_{cp}^2) \ddot{\varphi} = m_c g L_c \sin\varphi$
$- m_{cp} g L_{cp} \sin\varphi$

$\Longrightarrow (m_c L_c^2 + m_{cp} L_{cp}^2) \ddot{\varphi} + (m_{cp} L_{cp} - m_c L_c) g \sin\varphi = (m_{cp} L_{cp} - m_c L_c) \ddot{x} \cos\varphi$

$\Longrightarrow Q_1 . \ddot{\varphi} + Q_2 = Q_3 . \ddot{x}$

Q3 φ faible $\Longrightarrow \sin\varphi = \varphi$ et $\cos\varphi = 1$

On applique la TL $\Longrightarrow$

$\Phi(p) \left[(m_c L_c^2 + m_{cp} L_{cp}^2) p^2 + (m_{cp} L_{cp} - m_c L_c) g \right] = (m_{cp} L_{cp} - m_c L_c) A(p)$

$$\frac{\Phi(p)}{A(p)} = \frac{m_{cp} L_{cp} - m_c L_c}{(m_c L_c^2 + m_{cp} L_{cp}^2) p^2 + (m_{cp} L_{cp} - m_c L_c) g} = \frac{1/g}{\omega_0^2 p + 1}$$

avec $\omega_0 = \cdots$