



$\vec{T} = -T \hat{\phi}$

$$T_{11} = m \dot{r}^2$$

$$-T\ddot{\theta} = m(-R\dot{\theta}^2 - 2L\dot{\theta} - L\ddot{\theta})\hat{\rho} + m(R\ddot{\theta} + L\ddot{\theta})\hat{\theta}$$

$$\begin{aligned} \frac{d}{dt} \begin{pmatrix} \dot{\theta} \\ \dot{\phi} \end{pmatrix} &= \begin{pmatrix} -R\ddot{\theta} - 2\dot{L}\dot{\theta} - L\ddot{\theta} = 0 & (1) \\ m(R\ddot{\theta} + \dot{L}\dot{\theta} - L\ddot{\theta}^2) = -T & (2) \end{pmatrix} \quad 0,5 \end{aligned}$$

3 incógnitas, 2 ecuaciones.

$$\downarrow \text{ec. mas} \Rightarrow \left. \begin{aligned} L &= L_0 - R\theta \\ \dot{L} &= -R\dot{\theta} \\ \ddot{L} &= -R\ddot{\theta} \end{aligned} \right\} \textcircled{3} \quad 0,5$$

$$\textcircled{3} \text{ en } \textcircled{1} \Rightarrow -\tau \dot{\theta}^2 + 2\tau \dot{\theta}^2 - (L_0 - \tau \theta) \ddot{\theta} = 0$$

$$[R\dot{\sigma}^2 - (L_0 - R\sigma)\dot{\sigma} = 0] \text{ eq. mov. para } \sigma.$$

$$b) \quad R \dot{\vartheta} = (L_0 - R \vartheta) \frac{d\dot{\vartheta}}{d\vartheta} \Rightarrow \int_0^{\vartheta} \frac{R}{L_0 - R\vartheta} d\vartheta = \int_{\frac{v_0}{L_0}}^{\dot{\vartheta}} \frac{d\dot{\vartheta}}{\dot{\vartheta}}$$

$$\Rightarrow \left[\dot{\vartheta} = \frac{v_0}{L_0 - R\vartheta} \right]$$

c) in ② $\Rightarrow T = -m (\cancel{R\dot{\sigma}^0} - \cancel{R\dot{\sigma}^0} - L\dot{\sigma}^2)$

$$T = m(L_0 - R_0) \frac{v_0^2}{(L_0 - R_0)^2}$$

$T = T_{\text{máx}}$, se despreja $\theta_{\text{máx}}$

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