

P21 Seguimos la partícula con polares

$$\vec{r} = R\hat{p} \Rightarrow \vec{v} = R\dot{\phi}\hat{\phi}$$

$$a) \Rightarrow (-R\dot{\phi}^2\hat{p} + R\ddot{\phi}\hat{\phi})m = -c\vec{v} = -cR\dot{\phi}\hat{\phi}$$

$$\text{Tomando } \hat{\phi} \Rightarrow mR\ddot{\phi} = -cR\dot{\phi} \quad || \int$$

$$\dot{\phi} = -\frac{c}{m}\phi + C$$

$$\text{Imponemos } \dot{\phi}(\phi=0) = \frac{v_0}{R} \Rightarrow \dot{\phi}(\phi) = -\frac{c}{m}\phi + \frac{v_0}{R}$$

$$\Rightarrow F_{roce} = -cR\dot{\phi}\hat{\phi}$$

$$W_{roce} = \int_0^{\phi_1} \vec{F}_{roce} \cdot d\vec{r} = \int_0^{\phi_1} (-cR\dot{\phi}(\phi)\hat{\phi}) \cdot (Rd\phi\hat{\phi})$$

$$= +cR^2 \int_0^{\phi_1} \left(\frac{c}{m}\phi - \frac{v_0}{R} \right) d\phi = \boxed{\frac{(cR\phi_1)^2}{2m} - cRv_0\phi_1 = W_{roce}}$$

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$$b) \quad \dot{\phi}(\phi) = -\frac{c}{m}\phi + \frac{v_0}{R}$$

$$\text{Imponemos } \dot{\phi}(\phi_f) = 0$$

$$\Rightarrow \frac{c}{m}\phi_f = \frac{v_0}{R} \Rightarrow v_0 = \frac{cR}{m}\phi_f$$

$$\text{Si da } n \text{ vueltas} \Rightarrow \phi_f = 2\pi n$$

$$\Rightarrow \boxed{v_0 = \frac{2\pi R n c}{m}}$$

2 px