ESERCITAZIONE

ESERCIZIO 1
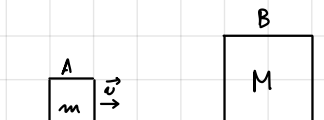
$m = 50\,g \qquad D = 0,6\,m \qquad \mu_0 = \frac{3}{10}$

$v = 5\,m/s \qquad V = 0\,m/s$

$M = ? \quad , \quad U = ?$

$$\begin{cases} mv + MV = mu + MU \\ \frac{1}{2}mv^2 + \frac{1}{2}MV^2 = \frac{1}{2}m^2u^2 + \frac{1}{2}MU^2 \end{cases} \quad \begin{cases} m(v-u) = M(U-V) \\ m(v^2-u^2) = M(U^2-V^2) \end{cases} \quad \begin{cases} \mathbin{\text{\textasciitilde}} \\ v+u = U+V \end{cases} \quad \begin{cases} m(v-u) = M(v+u-2V) \\ U = v + u - V \end{cases} \quad \begin{cases} (M+m)u = (m-M)v + 2MV \\ \mathbin{\text{\textasciitilde}} \end{cases}$$

$U = \dfrac{(m-M)v + 2MV}{m+M} \xrightarrow{\ \ V=0\ \ }$

$U = \dfrac{(M-m)V + 2mv}{m+M}$

$\Delta E_c = L_{uc} \quad \rightarrow \quad -\frac{1}{2}MU^2 = -\mu_0 Mg D \quad \rightarrow \quad U = \sqrt{2\mu_0 g D} = \frac{2mv}{M+m} \quad \Rightarrow \quad \dots \quad M \simeq 216\,g$

$\hookrightarrow \quad U = \dots \simeq -3,12\,m/s$

ESERCIZIO 3

1) $h' \rightarrow$ urto el

2) $h'' \rightarrow$ urto anael (tot) ; ΔE ?

1) $\begin{cases} m_1 v_1 + \cancel{m_2 v_2} = m_1 u_1 + m_2 u_2 \\ \frac{1}{2}m_1 v_1^2 + \cancel{\frac{1}{2}m_2 v_2^2} = \frac{1}{2}m_1 u_1^2 + \frac{1}{2}m_2 u_2^2 \end{cases} \rightarrow \begin{cases} m_1(v_1 - u_1) = m_2(v_1 - u_1) \\ U_2 = v_1 + u_1 \end{cases} \begin{cases} U_1 = \frac{m_1 - m_2}{m_1 + m_2}V_1 \\ U_2 = \frac{2m_1}{m_1 + m_2}V_1 \end{cases}$

$\frac{1}{2}m_2 u_2^2 = m_2 g h' \quad \rightarrow \quad h' = \frac{2m_1^2 v_1^2}{g(m_1 + m_2)^2}$

2) $\begin{cases} m_1 v_1 = (m_1 + m_2)\omega \\ \frac{1}{2}(m_1 + m_2)\omega^2 = (m_1 + m_2)g h'' \end{cases} \qquad \frac{1}{2}\frac{m_1^2 v_1^2}{m_1 + m_2} = (m_1 + m_2)g h'' \rightarrow h'' = \frac{1}{2}\frac{m_1^2}{(m_1 + m_2)^2}\cdot\frac{v_1^2}{g}$

$\Delta E = \frac{1}{2}(m_1 + m_2)\omega^2 - \frac{1}{2}m_1 v_1^2 = \frac{1}{2}\frac{m_1 v_1^2}{m_1 + m_2} - \frac{1}{2}m_1 v_1^2 = -\frac{1}{2}\frac{m_1 m_2}{m_1 + m_2}v^2$