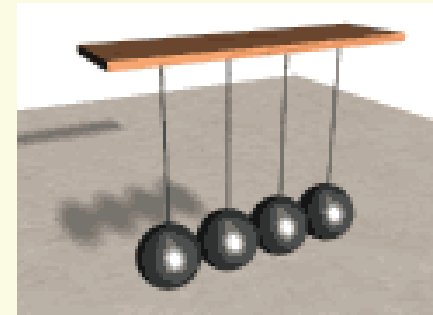
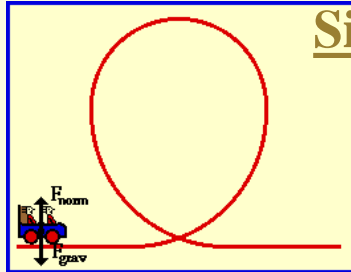
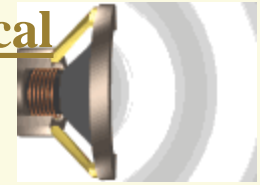


Aula 6: Leis de conservação

1. Movimento circular no campo gravítico
2. Colisão unidimensional
3. Colisão oblíqua

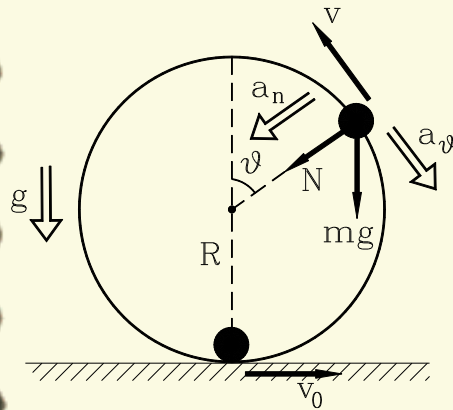


Simulação: forças no movimento circular vertical



Movimento num loop vertical: animação

1. Movimento circular no campo gravítico

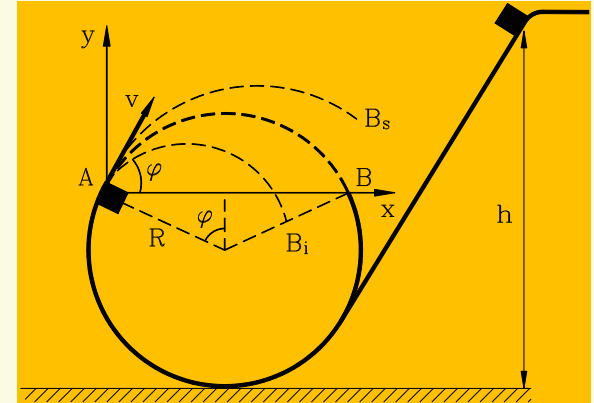


Estabilidade

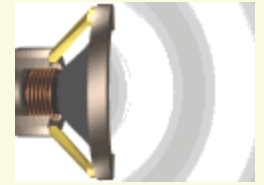
$$N = mg \left(\frac{v^2}{Rg} - \cos \theta \right)$$

Energia

$$\frac{mv^2}{2} + mgR(1 + \cos \theta) = \text{const.}$$



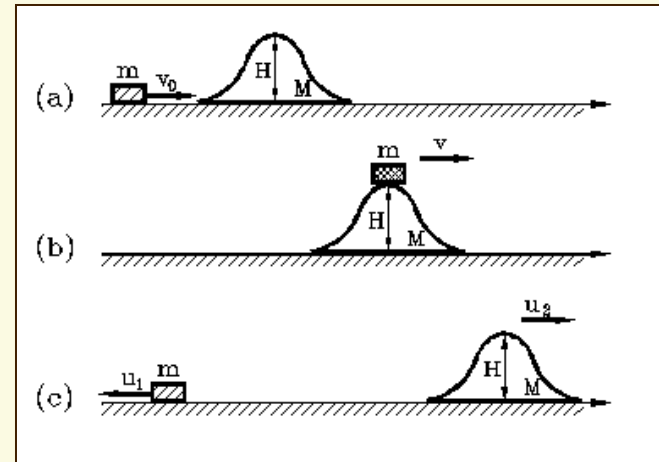
Simulação: colisão unidimensional



2. Colisão unidimensional

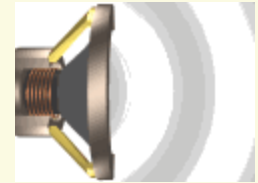
$$\vec{u}_1 = 2 \frac{m_1 \vec{v}_1 + m_2 \vec{v}_2}{m_1 + m_2} - \vec{v}_1 = 2\vec{v}_{CM} - \vec{v}_1$$

$$\vec{u}_2 = 2 \frac{m_1 \vec{v}_1 + m_2 \vec{v}_2}{m_1 + m_2} - \vec{v}_2 = 2\vec{v}_{CM} - \vec{v}_2$$

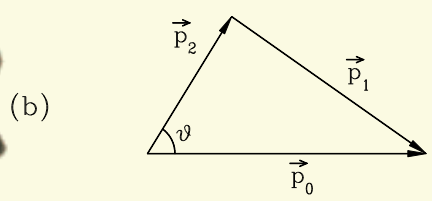
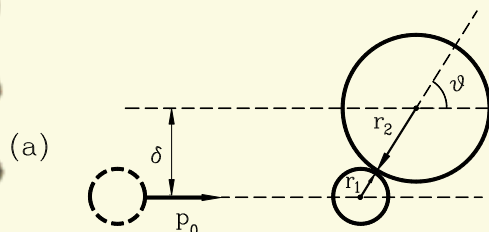


Simulação: colisão elástica oblíqua

Simulação: jogo de bilhar



3. Colisão oblíqua



$$p_2 = \frac{2}{1 + m_1 / m_2} p_0 \cos \theta$$

