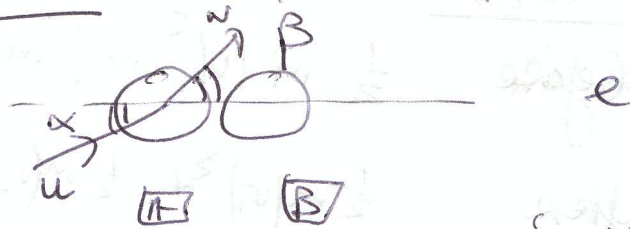


Higher
149305

laws PCM, NLR.

Both m



$$\cos \alpha = \frac{5}{\sqrt{35}}$$

$$\cos \beta = \frac{3}{7}$$

Before:

$$\vec{u}_1 = u \cos \alpha \vec{i} + u \sin \alpha \vec{j}$$

$$\vec{u}_2 = 0 \vec{i} + 0 \vec{j}$$

After:

$$\vec{v}_1 = v \cos \beta \vec{i} + u \sin \beta \vec{j}$$

$$\vec{v}_2 = v \vec{i} + 0 \vec{j}$$

pts unchanged because of smoothness.

PCM

$$m u \cos \alpha + 0 = m v \cos \beta + m v$$

$$u \cos \alpha = v \cos \beta + v \quad (1)$$

NLR

$$v_2 - v_1 = -e(u_2 - u_1)$$

$$v - v \cos \beta = -e(0 - u \cos \alpha)$$

$$v - v \cos \beta = e u \cos \alpha \quad (2)$$

$$\Rightarrow (u \cos \alpha - v \cos \beta) - v \cos \beta = e u \cos \alpha$$

$$\Rightarrow u \cos \alpha - 2v \cos \beta = e u \cos \alpha$$

$$\Rightarrow 2v \cos \beta = 0.6 u \cos \alpha$$

$$\Rightarrow 2v \left(\frac{3}{7}\right) = 0.6 u \frac{5}{\sqrt{35}}$$

$$\Rightarrow v = \frac{0.6 \left(\frac{35}{\sqrt{35}}\right) u}{6 \left(\frac{35}{\sqrt{35}}\right)} \Rightarrow v = 0.1 \sqrt{35} u$$

$$\therefore (1) \Rightarrow v = u \cos \alpha - v \cos \beta$$

$$= u \frac{5}{\sqrt{35}} - (0.1 \sqrt{35} u) \frac{3}{7}$$

$$= u \frac{5}{\sqrt{35}} - \frac{1}{10} \frac{35}{\sqrt{35}} \frac{3}{7} u$$

$$= \frac{u}{10} \left(\frac{50}{\sqrt{35}} - \frac{3}{7} \frac{35}{\sqrt{35}} \right)$$

$$= \frac{u}{10} \left(\frac{50}{\sqrt{35}} - \frac{15}{\sqrt{35}} \right)$$

$$= \frac{u}{10} \cdot \frac{35}{\sqrt{35}}$$

$$= 0.1 u \sqrt{35}$$

$$\therefore v = u$$

speeds equal after collision.

P.T.O.