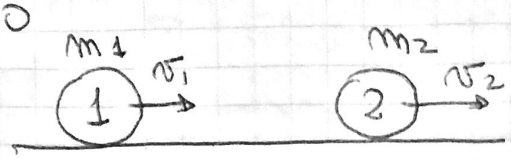
3.20



Sistema (1)+(2)

$(\Sigma m v)_i = (\Sigma m v)_f$

$m_1 = 4kg$
$v_1 = 6m/s$
$m_2 = 6kg$
$v_2 = 3m/s$

a) $m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2'$

choque plástico $\Rightarrow v_1' = v_2'$

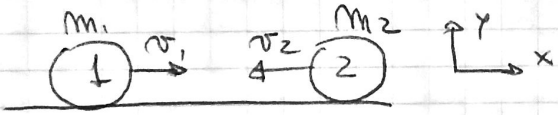
$m_1 v_1 + m_2 v_2 = (m_1 + m_2) v'$

$$v' = \frac{m_1 v_1 + m_2 v_2}{m_1 + m_2} = 4,2 m/s$$

b) $\Delta Ec = Ec^{(f)} - Ec^{(i)} = \frac{1}{2}(m_1 + m_2) v'^2 - \left(\frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2\right)$

$= 88,2 J - 99 J = -10,8 J.$

3.22



Sistema (1)+(2)

$m_1 = 5kg$
$v_1 = 3m/s$
$m_2 = 10kg$
$v_2 = -1,5m/s$

En general

$m_1 v_1 - m_2 v_2 = m_1 v_1' + m_2 v_2'$

← Ya adopté la ecuación al problema inicial.

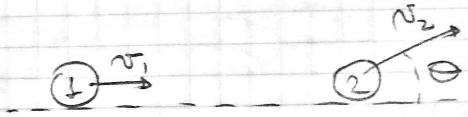
a) Si es plástico ($K=0$)

$m_1 v_1 - m_2 v_2 = (m_1 + m_2) v'$

b) Si es elástico ($K=1$)

$$\left(\begin{array}{cc|c} m_1 & m_2 & P \\ -1 & 1 & -Kv \end{array}\right)$$

3. 31



$m_1 = 8\,Kg$
$v_1 = 10\ m/s$
$m_2 = 10\,Kg$
$v_2 = 10\ m/s$
$\theta = 60°$.

$\hat{X}$: $m_1 v_1 + m_2 v_2 \cos\theta = (m_1 + m_2) v_x'$

$\hat{Y}$: $m_1 \cancel{v_1} + m_2 v_2 \operatorname{sen}\theta = (m_1 + m_2) v_y'$

$$v_x' = \frac{m_1 v_1 + m_2 v_2 \cos\theta}{m_1 + m_2} = 7{,}2\ m/s$$

$$v_y' = \frac{m_2 v_2 \operatorname{sen}\theta}{m_1 + m_2} = 4{,}81\ m/s.$$

$$|v'| = \sqrt{v_x^2 + v_y^2} = 8{,}65\ m/s.$$

$$\Delta E_c = \frac{1}{2}(m_1 + m_2) v'^2 - \frac{1}{2}(m_1 v_1^2 + m_2 v_2^2) = -226\,J.$$