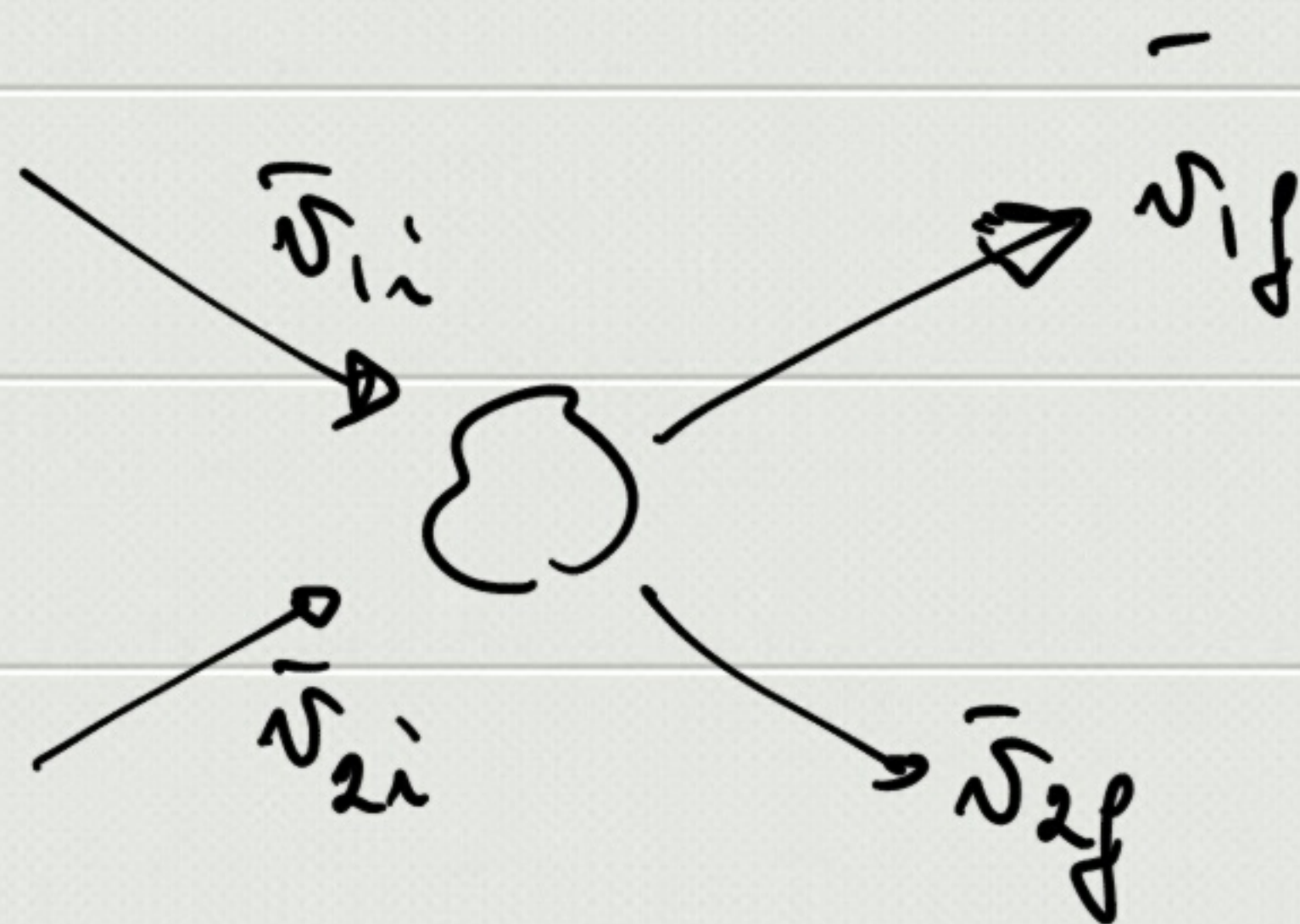


$$\begin{cases} \bar{P} = \text{cost} \\ E_k = \text{cost} \end{cases}$$



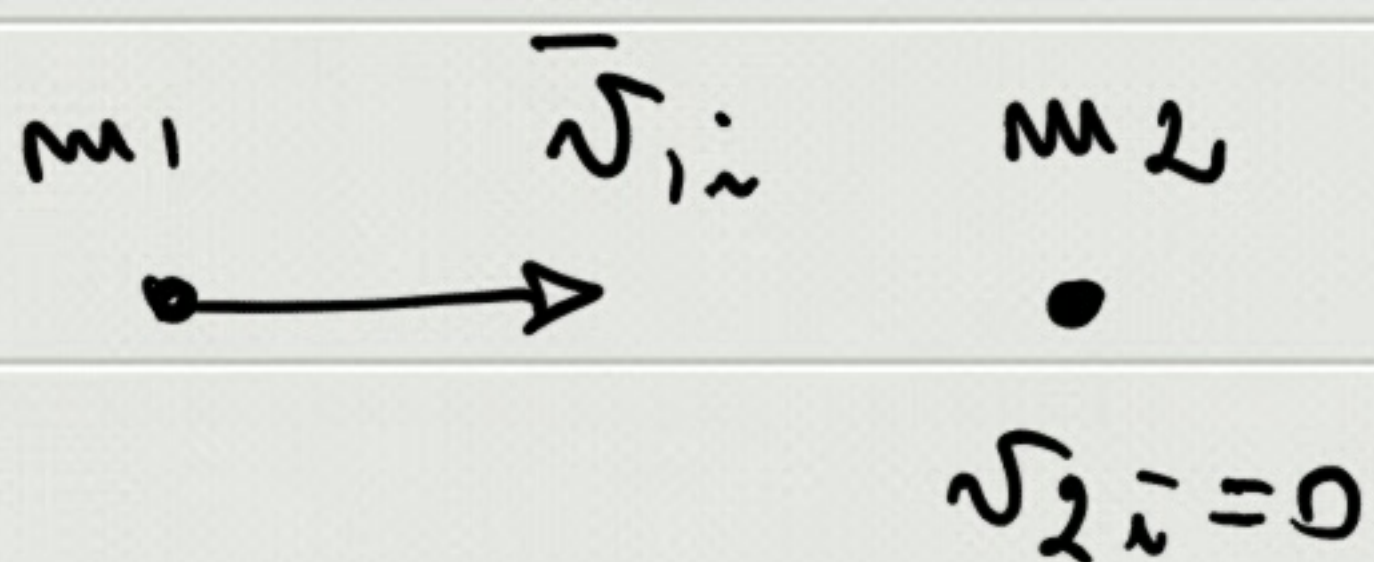
3D	4 equazioni	6 incognite
2D	3 "	4 "
1D	2 "	2 "

$$\begin{cases} m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f} \\ \frac{1}{2} m_1 v_{1i}^2 + \frac{1}{2} m_2 v_{2i}^2 = \frac{1}{2} m_1 v_{1f}^2 + \frac{1}{2} m_2 v_{2f}^2 \end{cases}$$

$$\begin{cases} v_{1f} = \frac{(m_1 - m_2) v_{1i} + 2 m_2 v_{2i}}{m_1 + m_2} \\ v_{2f} = \frac{(m_2 - m_1) v_{2i} + 2 m_1 v_{1i}}{m_1 + m_2} \end{cases}$$

$$R = \frac{E_{k,2,f}}{E_{k,1,i}}$$

(\sqrt{R} coeff. di restituzione)



$$v_{1f} = \frac{m_1 - m_2}{m_1 + m_2} v_{1i}$$

$$v_{2f} = \frac{2m_1}{m_1 + m_2} v_{1i}$$

$$R = \frac{\frac{1}{2} m_2 v_{2f}^2}{\frac{1}{2} m_1 v_{1i}^2} = \frac{m_2}{m_1} \frac{\left(\frac{4m_1^2}{(m_1 + m_2)^2} v_{1i}^2\right)}{v_{1i}^2} = \frac{4m_1 m_2}{(m_1 + m_2)^2}$$

$$\boxed{m_1 = m_2 = m} \Rightarrow v_{1f} = 0 \quad v_{2f} = v_{1i} \quad R = 1$$

$$\boxed{m_1 \gg m_2} \Rightarrow v_{1f} \approx \frac{m_1}{m_1} v_{1i} = v_{1i}$$

$$v_{2f} \approx \frac{2m_1}{m_1} v_{1i} = 2v_{1i}$$

$$R \approx \frac{4m_1 m_2}{m_1^2} \approx 0$$

$$\boxed{m_1 \ll m_2} \Rightarrow v_{1f} \approx \frac{-m_2}{m_2} v_{1i} = -v_{1i}$$

$$v_{2f} \approx \frac{2m_1}{m_2} v_{1i} \approx 0$$

$$R = \frac{4m_1 m_2}{m_2^2} \approx 0$$