

$$\text{SI HA IMMEDIATAMENTE } \vec{V}_{CM} = \frac{m_1 \vec{V}_1 + m_2 \vec{V}_2}{m_1 + m_2}, \quad K = \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2$$

$$\text{VISTO CHE } K = K_{CM} + \frac{1}{2} M_{TOT} V_{CM}^2 \Rightarrow K_{CM} = K - \frac{1}{2} M_{TOT} V_{CM}^2$$

$\vec{V}_1 \cdot \vec{V}_2 = 0$  PERCHÉ  
SONO PERPENDICOLARI

$$K_{CM} = \frac{1}{2} (m_1 + m_2) \frac{m_1^2 v_1^2 + m_2^2 v_2^2 + 2 m_1 m_2 \vec{V}_1 \cdot \vec{V}_2}{(m_1 + m_2)^2} + \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 = \frac{1}{2} \frac{m_1 m_2}{(m_1 + m_2)} (v_1^2 + v_2^2) = K_{CM}$$