

$$\kappa(t) = \frac{|p_k|}{|q_i - q_j|} = \sqrt{\frac{m_1 m_2 m_3 K}{MI}}$$

$$\therefore \frac{\kappa(t)^2}{m_1 m_2 m_3} = \frac{p_k^2 / m_k}{m_i m_j (q_i - q_j)^2} = \frac{K}{MI}$$