

31.5: Inelastic Collisions

Now let's consider a one-dimensional inelastic collision of two bodies—one for which the coefficient of restitution is some number between 0 and 1. Then the conservation of momentum applies (Eq. 31.4.2), so that the sum of the momenta before the collision equals the sum of the momenta after the collision:

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}. \quad (31.5.1)$$

This is one equation, but assuming that we know the masses and initial velocities, there are two unknowns: the final velocities v_{1f} and v_{2f} . In order to solve simultaneous equations, there must be as many equations as unknowns, so we're one equation short. So this problem cannot be solved unless we're given some more information, such as one of the final velocities or the coefficient of restitution.

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