3.5: Linear Momentum

Theorem:

The total momentum of a system of particles equals the total mass times the velocity of the centre of mass.

Thus:

$$\mathbf{P} = \sum m_i \mathbf{v}_i = \sum m_i (\overline{\mathbf{v}} + \mathbf{v}_i^{'}) = M\overline{\mathbf{v}} + 0. \tag{3.5.1}$$