M2 Notes

1   Centres of mass
1.1   Centre of mass of a discrete mass distribution

$$\overline{x} = \frac{\sum m_i x_i}{\sum m_i}$$

2   Collisions
2.1   Impulse and Momentum
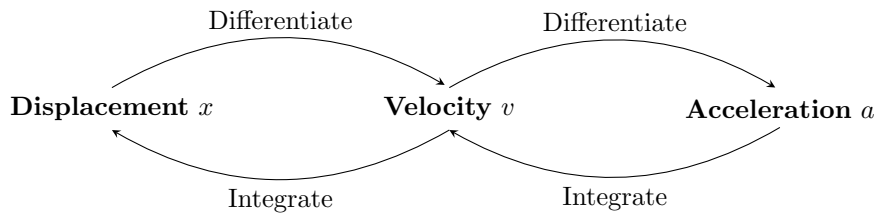
$$I = m(v - u)$$

2.2   Coefficient of restitution

$$e = \frac{\text{Speed of seperation}}{\text{Speed of approach}}$$

This can be rearranged to give in in terms of heights

$$e = \frac{\sqrt{h_2}}{\sqrt{h_1}}$$

3   Kinematics

4   Work, Energy and Power

$$\text{Work} = \text{Force} \times \text{Distance}$$

$$WD = \mu R \times \text{Distance}$$

$$E_K = \frac{1}{2}mv^2$$

$$E_P = mgh$$

$$P = Fv$$