



$$J(x) = J(x + \Delta x) - J(\Delta x)$$

$$[\rho] = \frac{\text{kg}}{\text{m}}$$

$$J(\Delta x) = \rho \cdot \Delta x \cdot x^2$$

$$\frac{dJ(x)}{dx} =$$

$$m = \rho \cdot x \quad J = \int v^2 \cdot dm$$

$$\frac{dm}{dx} = \rho$$

$$dm = \rho \cdot dx$$

$$J = \int \rho \cdot x^2 \cdot dx$$

$$J = \rho \int_0^l x^2 \cdot dx$$

$$J = \rho \cdot \left[ \frac{x^3}{3} \right]_0^l$$

$$J = \rho \cdot \left[ \frac{l^3}{3} - 0 \right]$$

$$J = \frac{1}{3} \cdot m \cdot l^2 \quad m = l \cdot \rho$$

$$J = J_0 + m \cdot l^2$$

$$m = \rho \cdot r$$

$$\frac{dm}{dr} = \rho$$

$$dm = \rho \cdot dr$$

$$I = \int r^2 \cdot dm$$

$$I = \int_0^l r^2 \cdot \rho \cdot dr = \rho \int_0^l r^2 \cdot dr$$

$$I = \rho \cdot \left[ \frac{r^3}{3} \right]_0^l = \frac{1}{3} \cdot \rho \cdot l^3$$

$$I = \frac{1}{3} m \cdot l^2 \quad \left\{ \rho \cdot l = m \right\}$$

$$J(x + \Delta x) - J(x) = \rho \cdot x^2 \cdot \Delta x$$

$$\frac{dJ}{dx} = \lim_{\Delta x \rightarrow 0} \frac{\rho \cdot x^2 \cdot \Delta x}{\Delta x} = \rho \cdot x^2$$

$$dJ = \rho \cdot x^2 \cdot dx$$

$$\int_0^l dJ = \int_0^l \rho \cdot x^2 \cdot dx$$

$$J - 0 = \rho \cdot \left[ \frac{x^3}{3} \right]_0^l$$

$$J - 0 = \frac{1}{3} \rho \cdot l^3 - 0 \quad \left\{ \rho \cdot l = m \right\}$$

$$J = \frac{1}{3} \cdot m \cdot l^2$$