

CH_12

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12.1 Centroids of Plane Areas

12.2 Centroids of Composite Areas

12.3 Moments of Inertia of Plane Areas

Moments of Inertia

Radius of Gyration

12.4 Parallel-Axis Theorem For Moments of Inertia

12.1 Centroids of Plane Areas

$$\bar{x} = \frac{Q_y}{A} = \frac{\int x dA}{\int dA} \quad \bar{y} = \frac{Q_x}{A} = \frac{\int y dA}{\int dA}$$

12.2 Centroids of Composite Areas

$$\bar{x} = \frac{Q_y}{A} = \frac{\sum \bar{x}_i A_i}{\sum A_i} \quad \bar{y} = \frac{Q_x}{A} = \frac{\sum \bar{y}_i A_i}{\sum A_i}$$

12.3 Moments of Inertia of Plane Areas

Moments of Inertia

$$I_x = \int y^2 dA$$

$$I_y = \int x^2 dA$$

Radius of Gyration

$$r_x = \sqrt{\frac{I_x}{A}} \quad r_y = \sqrt{\frac{I_y}{A}}$$

12.4 Parallel-Axis Theorem For Moments of Inertia

$$I_x = I_{x_c} + Ad_1^2$$

$$I_y = I_{y_c} + Ad_2^2$$