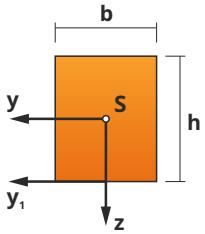
M4 Flächenträgheitsmomente

für ausgewählte Geometrien

Rechteck

Seite a, Seite b



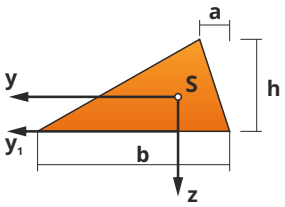
$$I_y = \frac{bh^3}{12}$$

$$I_z = \frac{hb^3}{12}$$

$$I_{y1} = \frac{bh^3}{3}$$

Dreieck

Seite a, Höhe h



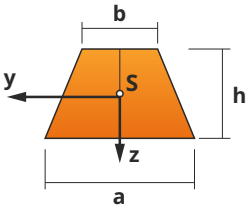
$$I_y = \frac{bh^3}{36}$$

$$I_z = \frac{bh(b^2 - ba + a^2)}{12}$$

$$I_{y1} = \frac{bh^3}{12}$$

Trapez

Seite a, Seite b, Höhe h

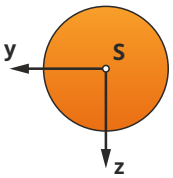


$$I_y = h^3 \frac{(a+b)^2 + 2ab}{36(a+b)}$$

$$I_y = \frac{h}{48}(a+b)(a^2+b^2)$$

Kreis

Radius R



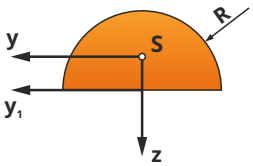
$$I_y = \frac{\pi R^4}{4}$$

$$I_z = \frac{\pi R^4}{4}$$

$$I_{y1} = \frac{5\pi R^4}{4}$$

Halbkreis

Radius R



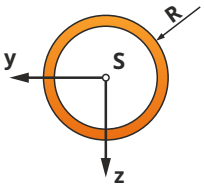
$$I_y = \frac{R^4(9\pi^2 - 64)}{72\pi}$$

$$I_z = \frac{\pi R^4}{8}$$

$$I_{y1} = \frac{\pi R^4}{8}$$

Kreisring

Radius R



$$I_y = \frac{\pi}{4}(R^4 - r^4)$$

$$I_z = \frac{\pi}{4}(R^4 - r^4)$$

Axiales

Flächenträgheitsmoment

$$I_y = \int z^2 \, dA$$

$$I_z = \int y^2 \, dA$$

Biaxiales

Flächenträgheitsmoment

$$I_{yz} = -\int yz \, dA$$

Polares

Flächenträgheitsmoment

$$I_P = I_y + I_z$$