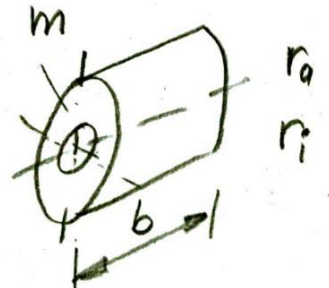


Massenträgheit J für Hohlzylinder

$$J = m \frac{r_i^2 + r_a^2}{2}$$

aus Formelsammlung



$$\left. \begin{aligned} m_a &= \rho \cdot \pi \cdot r_a^2 \cdot b \\ m_i &= \rho \cdot \pi \cdot r_i^2 \cdot b \end{aligned} \right\} \begin{aligned} m &= m_a - m_i \\ m &= \rho \pi \cdot b (r_a^2 - r_i^2) \end{aligned}$$

$$J = J_a - J_i = \frac{1}{2} m_a r_a^2 - \frac{1}{2} m_i r_i^2$$

$$J = \frac{1}{2} \rho \cdot \pi \cdot r_a^2 \cdot b \cdot r_a^2 - \frac{1}{2} \rho \cdot \pi \cdot r_i^2 \cdot b \cdot r_i^2$$

$$= \frac{1}{2} \rho \pi b (r_a^4 - r_i^4)$$

$$= \frac{1}{2} \rho \pi \cdot b \underbrace{(r_a^2 - r_i^2)}_{m} (r_a^2 + r_i^2)$$

$$J = \frac{m}{2} (r_a^2 + r_i^2)$$