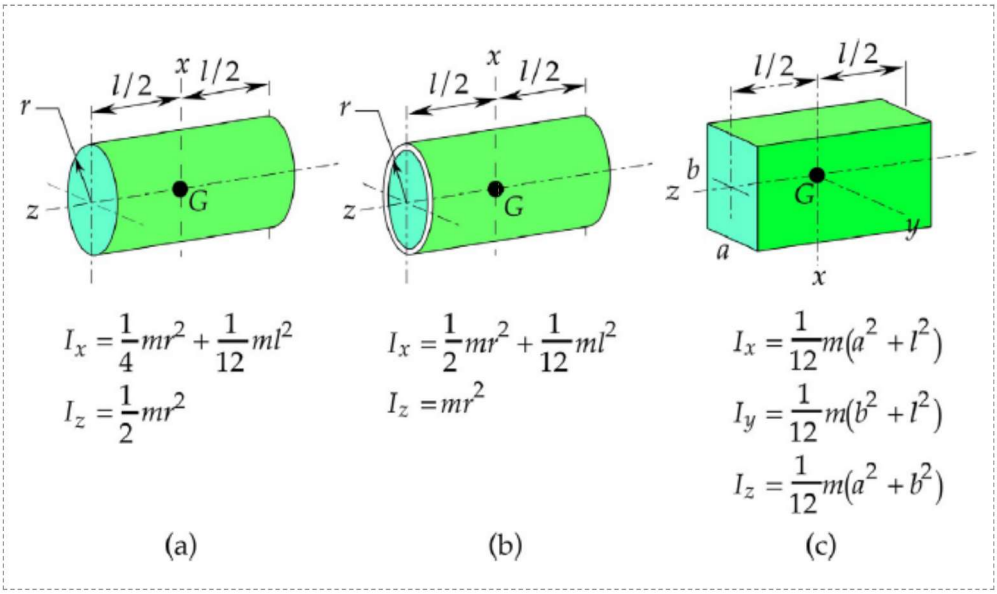


$$I_x = \frac{1}{4}mr^2 + \frac{1}{12}ml^2 \qquad I_z = \frac{1}{2}mr^2$$

(a)

$$I_x = \frac{1}{2}mr^2 + \frac{1}{12}ml^2 \qquad I_z = mr^2$$

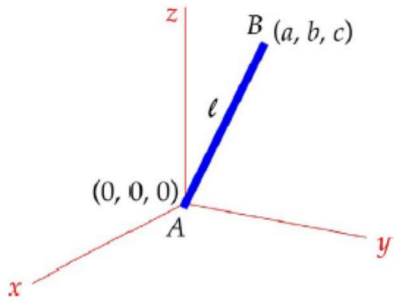
(b)

$$I_x = \frac{1}{12}m(a^2 + l^2) \qquad I_y = \frac{1}{12}m(b^2 + l^2) \qquad I_z = \frac{1}{12}m(a^2 + b^2)$$

(c)

Example

Calculate the moments of inertia of a slender, homogeneous straight rod of length ℓ and mass m shown in Fig. 11.11. One end of the rod is at the origin and the other has coordinates (a, b, c).



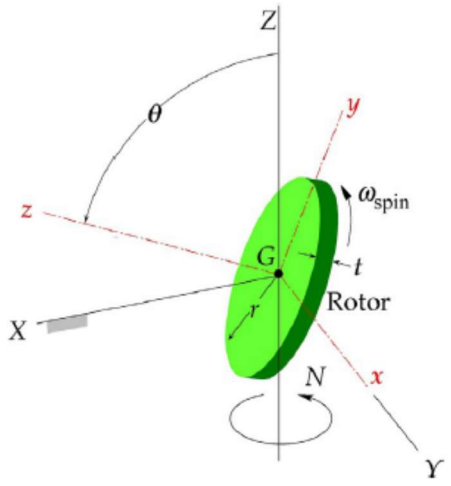
Details

Example

The gyro rotor (Fig. 11.12) in Example 11.3 has a mass m of 5 kg, radius r of 0.08 m, and thickness t of 0.025 m. If $N = 2.1$ rad/s, $\dot{\theta} = 4$ rad/s, $\omega = 10.5$ rad/s, and $\theta = 60°$, calculate

(a) the angular momentum of the rotor about its center of mass G in the body-fixed xyz frame and

(b) the angle between the rotor's angular velocity vector and its angular momentum vector.



Details