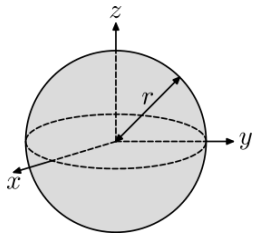
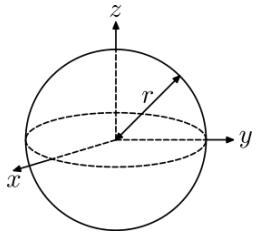
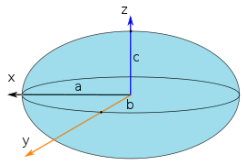
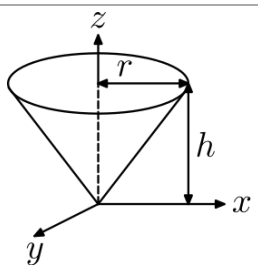
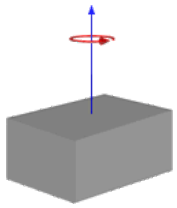
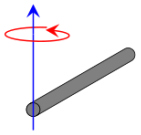
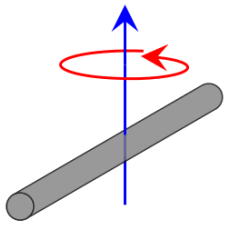
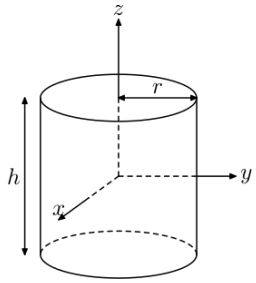
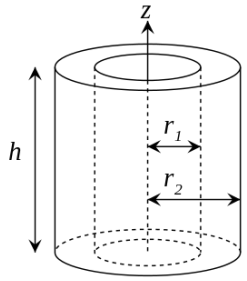
Description	Figure	Moment of inertia tensor
Solid sphere of radius r and mass m		$I = \begin{bmatrix} \frac{2}{5}mr^2 & 0 & 0 \\ 0 & \frac{2}{5}mr^2 & 0 \\ 0 & 0 & \frac{2}{5}mr^2 \end{bmatrix}$
Hollow sphere of radius r and mass m		$I = \begin{bmatrix} \frac{2}{3}mr^2 & 0 & 0 \\ 0 & \frac{2}{3}mr^2 & 0 \\ 0 & 0 & \frac{2}{3}mr^2 \end{bmatrix}$
Solid ellipsoid of semi-axes a, b, c and mass m		$I = \begin{bmatrix} \frac{1}{5}m(b^2+c^2) & 0 & 0 \\ 0 & \frac{1}{5}m(a^2+c^2) & 0 \\ 0 & 0 & \frac{1}{5}m(a^2+b^2) \end{bmatrix}$
Right circular cone with radius r, height h and mass m, about the apex		$I = \begin{bmatrix} \frac{3}{5}mh^2+\frac{3}{20}mr^2 & 0 & 0 \\ 0 & \frac{3}{5}mh^2+\frac{3}{20}mr^2 & 0 \\ 0 & 0 & \frac{3}{10}mr^2 \end{bmatrix}$
Solid cuboid of width w, height h, depth d, and mass m		$I = \begin{bmatrix} \frac{1}{12}m(h^2+d^2) & 0 & 0 \\ 0 & \frac{1}{12}m(w^2+d^2) & 0 \\ 0 & 0 & \frac{1}{12}m(w^2+h^2) \end{bmatrix}$
Slender rod along y-axis of length l and mass m about end		$I = \begin{bmatrix} \frac{1}{3}ml^2 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & \frac{1}{3}ml^2 \end{bmatrix}$
Slender rod along y-axis of length l and mass m about center		$I = \begin{bmatrix} \frac{1}{12}ml^2 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & \frac{1}{12}ml^2 \end{bmatrix}$
Solid cylinder of radius r, height h and mass m		$I = \begin{bmatrix} \frac{1}{12}m(3r^2+h^2) & 0 & 0 \\ 0 & \frac{1}{12}m(3r^2+h^2) & 0 \\ 0 & 0 & \frac{1}{2}mr^2 \end{bmatrix}$
Thick-walled cylindrical tube with open ends, of		

inner radius r_1, outer radius r_2, length h and mass m		$I = \begin{bmatrix} \frac{1}{12}m(3(r_2^2+r_1^2)+h^2) & 0 & 0 \\ 0 & \frac{1}{12}m(3(r_2^2+r_1^2)+h^2) & 0 \\ 0 & 0 & \frac{1}{2}m(r_2^2+r_1^2) \end{bmatrix}$

See also

- List of second moments of area
- Parallel axis theorem
- Perpendicular axis theorem

Notes

a. Width perpendicular to the axis of rotation (side of plate); height (parallel to axis) is irrelevant.

References

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2. Classical Mechanics - Moment of inertia of a uniform hollow cylinder (http://www.livephysics.com/problems-and-answers/classical-mechanics/find-moment-of-inertia-of-a-uniform-hollow-cylinder.html) Archived (https://web.archive.org/web/20080207072800/http://www.livephysics.com/problems-and-answers/classical-mechanics/find-moment-of-inertia-of-a-uniform-hollow-cylinder.html) 2008-02-07 at the Wayback Machine. LivePhysics.com. Retrieved on 2008-01-31.
3. Satterly, John (1958). "The Moments of Inertia of Some Polyhedra". *The Mathematical Gazette*. Mathematical Association. **42** (339): 11–13. doi:10.2307/3608345 (https://doi.org/10.2307%2F3608345). JSTOR 3608345 (https://www.jstor.org/stable/3608345).
4. Ferdinand P. Beer and E. Russell Johnston, Jr (1984). *Vector Mechanics for Engineers, fourth ed*. McGraw-Hill. p. 911. ISBN 0-07-004389-2.
5. Eric W. Weisstein. "Moment of Inertia — Ring" (http://scienceworld.wolfram.com/physics/MomentofInertiaRing.html). Wolfram Research. Retrieved 2016-12-14.
6. A. Panagopoulos and G. Chalkiadakis. Moment of inertia of potentially tilted cuboids. Technical report, University of Southampton, 2015.
7. David Morin (2010). *Introduction to Classical Mechanics: With Problems and Solutions; first edition (8 January 2010)* (https://archive.org/details/introductiontocl00mori/page/320). Cambridge University Press. p. 320 (https://archive.org/details/introductiontocl00mori/page/320). ISBN 978-0521876223.

External links

- The inertia tensor of a tetrahedron (http://number-none.com/blow/inertia/bb_inertia.doc)
- Tutorial on deriving moment of inertia for common shapes (http://www.miniphysics.com/uy1-calculation-of-moment-of-inertia-of-2.html)