

Physics 325 Homework 8

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Due: 11/6/02 by 4 PM

Problem 1 - The Earth

The equatorial radius R_e of the Earth is 6,378,140 m. The polar radius R_p of the Earth is 6,356,752 m. The mass of the Earth M is 5.9736×10^{24} kg.

What is the ratio of the moment of inertia of the Earth about its rotational axis to its moment of inertia about an axis through the equator?

Problem 2 - Triangular mass

Three uniform rods, each of mass M and length L are welded together to form an equilateral triangle.

- Find the moment of inertia of the object about an axis lying along one side of the triangle
- Find the moment of inertia about an axis parallel to the side of the triangle that passes through the object's center of mass.

Problem 3 - Boas 6.3.9

The force $\vec{F} = 2\hat{i} - \hat{j} - 5\hat{k}$ acts at the point $(-5, 2, 1)$.

- Find the torque due to \vec{F} about the origin
- Find the torque about the line $2x = -4y = -z$

Hint: if you can't remember how to make a parametric line $\vec{r} = \vec{r}_o + \vec{A}t$, given this information, see chapter 3.