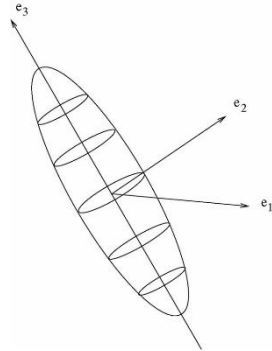


INDIAN INSTITUTE OF TECHNOLOGY PATNA

Physics Tutorial 6

1. The Earth's axis of rotation precesses about the perpendicular to its orbital plane with a period of 25810 yr. Calculate the torque on the Earth that is causing this precession.
2. Analyze stability of symmetric top as in figure, having diagonal elements of the moment of inertia tensor $I_1=I_2=I$, and I_3 , using Euler equation.



3. A person is standing still on a location P as shown in figure 1 on Earth. (a) Plot the nature of centrifugal force ($F_{cent.}$) as latitude varies from north pole to south pole through equator. (b) What is the effective gravity felt by him due to the centrifugal force?

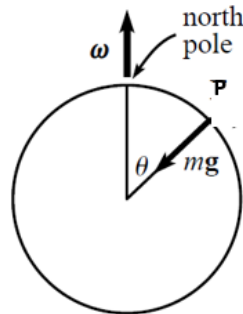


Fig 1

4. Consider an object is dropped under gravity in the $-\mathbf{e}_z$ direction as shown in figure. In the problem, consider λ as the latitude and ω as the angular velocity of the earth.
 - a. What is the nature of the Coriolis force?
 - b. Find the Coriolis speed and deflection of the object due to the force.
 - c. What is the nature of Coriolis force if the object is thrown upward.

