

M09E.2 - Pulsar (J94E.2)

Problem

Approximate a pulsar to be a magnetized sphere of radius a . The pulsar has moment of inertia I and rotates about the z axis with angular velocity ω . The magnetization, \mathcal{M} , is uniform and perpendicular to the z axis. In the sense that $\omega a \ll c$, the sphere is rotating slowly. As a result of the rotation the star is radiating.

Assuming I , \mathcal{M} and a to be constant, calculate the time rate of change of ω .