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PHY422/820: Classical Mechanics

FS 2021

Exam Preparation

December 10, 2021

Problem P10 – Moment of Inertia Tensor of an Ellipsoid

Consider a homogenous ellipsoid with mass M and semi-axes a, b, c , which can be parameterized as

$$\frac{x^2}{\alpha^2} + \frac{y^2}{\beta^2} + \frac{z^2}{\gamma^2} = R^2, \quad (1)$$

with $a = \alpha R, b = \beta R, c = \gamma R$.

1. Construct the mass density of the ellipsoid.
2. Compute the moment of inertia tensor.