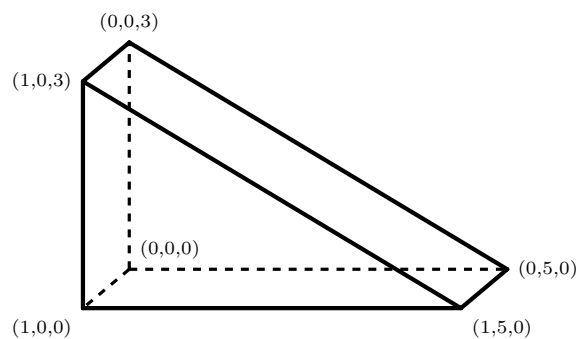


All questions from Taylor, Chapter 10. Please show all your work and write legibly for full credit!

- **10.11:** Finding the moment of inertia about a single axis.
- **10.14:** Conservation of angular momentum.
- **10.36:** Inertia tensors and principal axes. Solve this by hand please, and this will be the last and only time I ever ask you to do so!
- **10.47:** Free precession.
- **My Problem**

1. Consider a three dimensional wedge whose edges are bounded by the coordinates (in meters) given in this image:



The density of the wedge varies and is determined by:

$$\rho(x, y, z) = 25 - y^2$$

in  $\text{kg/m}^3$ . Feel free to use computer assistance on this problem.

- (a) Find the location of the center of mass.
- (b) For rotations about the center of mass, determine the inertial tensor. Be careful with shifting your origin to the center of mass, as the density is defined with respect to the original origin!
- (c) Find the principal axes.
- (d) Plot a depiction of the wedge along with the principal axes. Draw the axes as originating from the center of mass.