PMS – Exercise Sheet 10

Exercise 1

$$I = \sum_i m_i \begin{pmatrix} y_i^2 + z_i^2 & -x_i y_i & -x_i z_i \\ -y_i x_i & x_i^2 + z_i^2 & -y_i z_i \\ -z_i x_i & -z_i y_i & x_i^2 + y_i^2 \end{pmatrix} = \begin{pmatrix} 59.2 & 0 & 0 \\ 0 & 3.52 & 0 \\ 0 & 0 & 62.72 \end{pmatrix}$$

Exercise 2

$$\vec{L} = I\vec{\omega} = \begin{pmatrix} 59.2 & 0 & 0 \\ 0 & 3.52 & 0 \\ 0 & 0 & 62.72 \end{pmatrix} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = (0,\, 3.52,\, 0)$$

Exercise 3

$$I' = \begin{pmatrix} 61.888 & -1.152 & 0 \\ -1.152 & 0.576 & 0 \\ 0 & 0 & 62.464 \end{pmatrix}$$

Exercise 4

$$\vec{\omega}' = I'^{-1}\vec{L} \approx (0.12,\, 6.35,\, 0)$$

Exercise 5

TODO