

Homework 03

Problem 1 (5 points)

Prove that for an orbit governed by

$$\frac{p}{r} = 1 + e \cos(\theta)$$

the semiminor axis (b) is given by $p/\sqrt{1 - e^2}$.

Problem 2 (5 points)

Plot an orbit in x,y coordinates for $p = 1$ m and $e = 0.5$. Make sure that axes ratio is 1, i.e. the plot is not squeezed.

Problem 3 (5 points)

Suppose two masses with their mass ration $m_1/m_2 = 3$ orbit each other, suppose also that the semimajor axis of the orbit is $a = 10^4$ m in the central of mass reference frame and the eccentricity is $e=0.2$. Plot orbits of both masses on the same plot as they orbit each other.

Make sure that axes ratio is 1, i.e. the plot is not squeezed.

Problem 4 (5 points)

Solve problem 2.12 from the text book.

Problem 5 (5 points)

Look at the notes at the page 3 of the lecture 06 notes. Proves that eq.2 follows from eq.1.