

## COMPUTATIONAL PROBLEM RELATED TO PLANETARY MOTION

(due date is flexible but it is wise to hand in the material by 4/8/16 or thereabouts for the first part)

- 1) (minimum but remember: counts for 10% of the final grade) Compute and display the motion of a planet around the sun with the units for masses and time discussed in class.
  - a) By using the coordinates  $r, \phi$  discussed in class.
  - b) By using coordinates  $x, y$ .

In both cases start with the initial condition discussed in class. Vary the step size for the time variable to explore the accuracy of the calculation by comparing with the exact solution for the shape of the orbit. Vary the initial conditions to explore other possible orbits like circles and hyperbolas and illustrate accordingly.

- 2) (additional credit to compensate for points missed on the Midterm or Final) Solve the problem for the motion of two planets around the sun. You may assume that both planets move in the same plane. One should be an Earth and the other a Jupiter like planet. Use appropriate initial conditions for “Earth” and “Jupiter” and compare the resulting “Earth” orbit to the one found without “Jupiter”. Additional project elaboration and extensions are clearly possible and will be awarded at an appropriate level. You could think of making a movie for example...