Problem Set 12

Issued: 11 April 2017
Due: 25 April 2017

Note: only undergraduates are required to turn in this problem set, but all students should do the reading listed below.

**Project presentations**: are scheduled during lecture on 25 and 27 April. I’ll pass around a signup sheet for time slots next week. Please make sure to look over the presentation hints that are posted on the class webpage before you write your talk.

**Undergrads**: you’ll be writing short reports on each talk, so bring your computer on those days.

**Reading**: Classical Mechanics Notes; Berreby paper (see the PS12 bullet on the course webpage for a link to this).

**Bibliography:**


Problems:

Adapt your RK4 algorithm from PS4 to the two-body equations — the system of equations labeled (4) in the Classical Mechanics Notes. To do this, you’ll have to pull these equations apart into twelve first-order ODEs by rewriting them out in terms of their coordinates, as I show in the Notes.

Plug your answers to problem 4(d) on PS11 into these ODEs and integrate them for half a dozen orbits, using at least 1000 timesteps per orbit period. Plot your results in physical space: one point for each star, looking down from above on the plane of the orbit. Turn in a plot and draw a few arrows to show which way each star is going.

Does your binary orbit properly? Does the center of mass appear to move? Which way?