

## Ay190 – Worksheet 13

John Pharos

Date: February 25, 2014

Supernova Remnants: Matthias Raives, Mee Chatarin Wongurailertkun

### Problem 1

I have familiarized myself.

### Problem 2

I simulated the Sun-Earth system for 4 years. The radius of the orbit remained basically constant over the course of the simulation.

### Problem 3

With  $10^4$  points over 4 years, the magnitude of the largest change in energy is around  $2.76 \cdot 10^{37}$ , which amounts to about a tenth of a percent of the energy in the system. As the resolution increases, this magnitude decreases even further.

### Problem 4

Over the century, the system changes energy by about  $7 \cdot 10^{50}$  ergs. This is a large fraction of the energy remaining in the system, which is much worse than in the previous problems, but that is to be expected, since the simplistic n-body model begins to fail in more complicated systems.

This can further be seen by comparing the trajectories in stars13.dat. The simulation diverges from observation rather quickly.