

## 1 Direct summation n-body code

### 1.1 Sun-Earth System

I implemented RK4 for this code. The sun-earth system performs as expected, and can be seen by running the code as-is. The change in energy as a function of time is given in Figure 1.

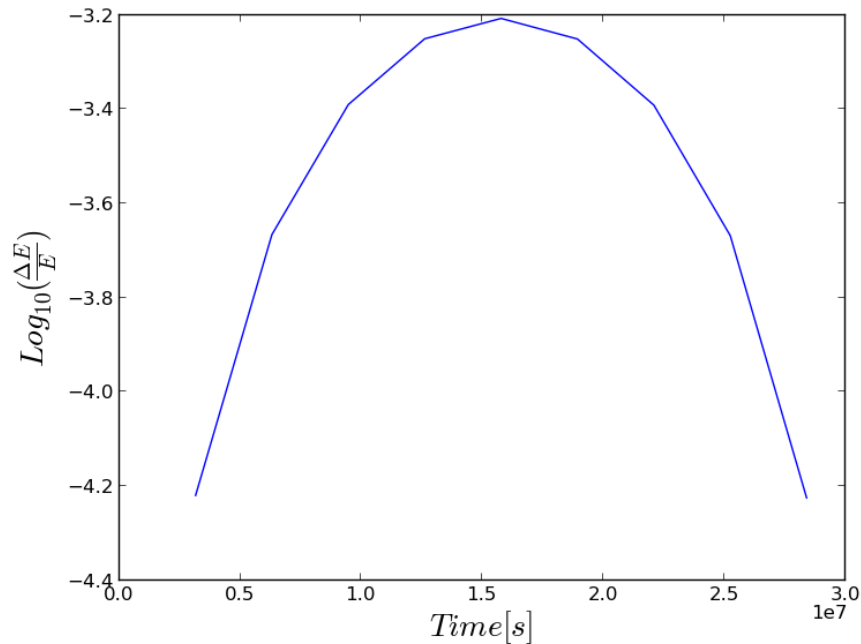


Figure 1: Change in total sun-earth system energy as a function of time.

### 1.2 Galactic Center

The program can be run for the sgrAstar.dat file by commenting in/out the indicated sections in the code. The total energy conservation in this system is much worse, as can be seen from Figure 2.

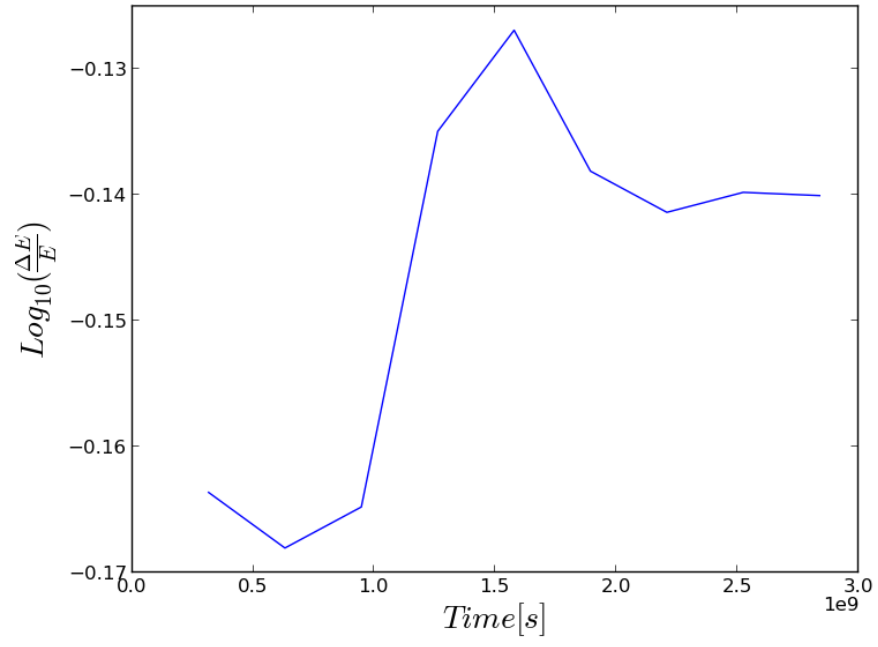


Figure 2: Change in total 'sgrAstar' system energy as a function of time.