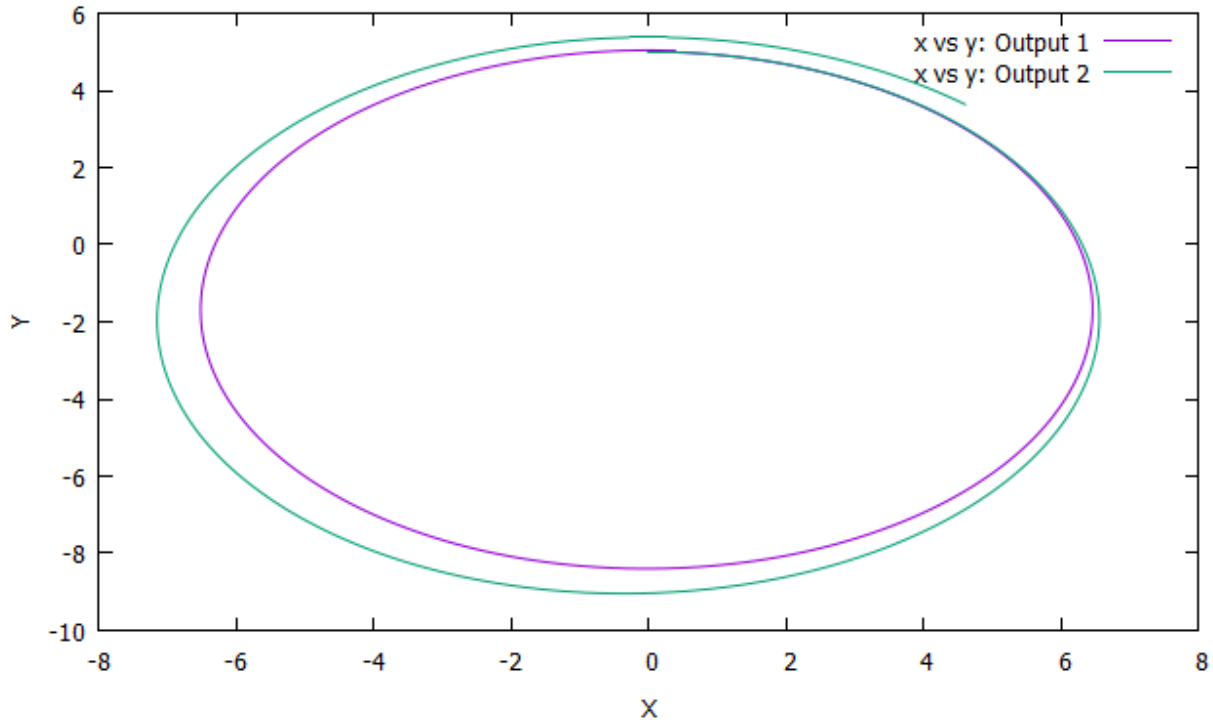
Riley Payung

CDS 251

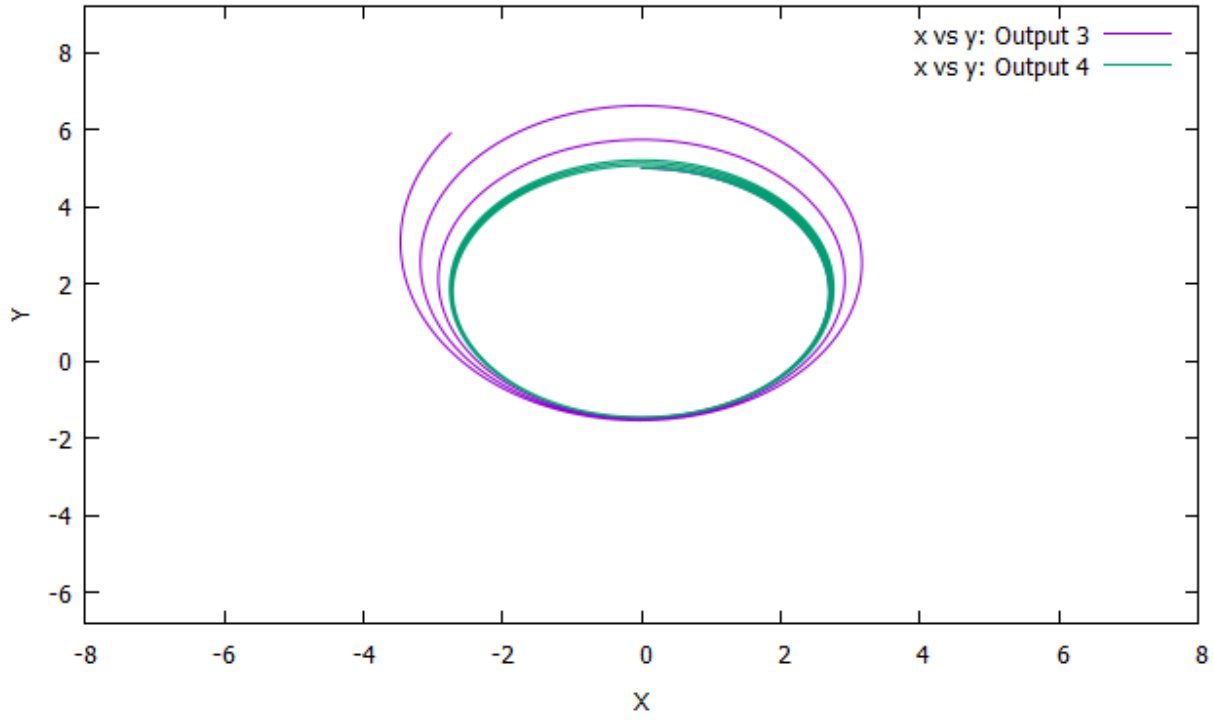
05/07/2020

Homework 12

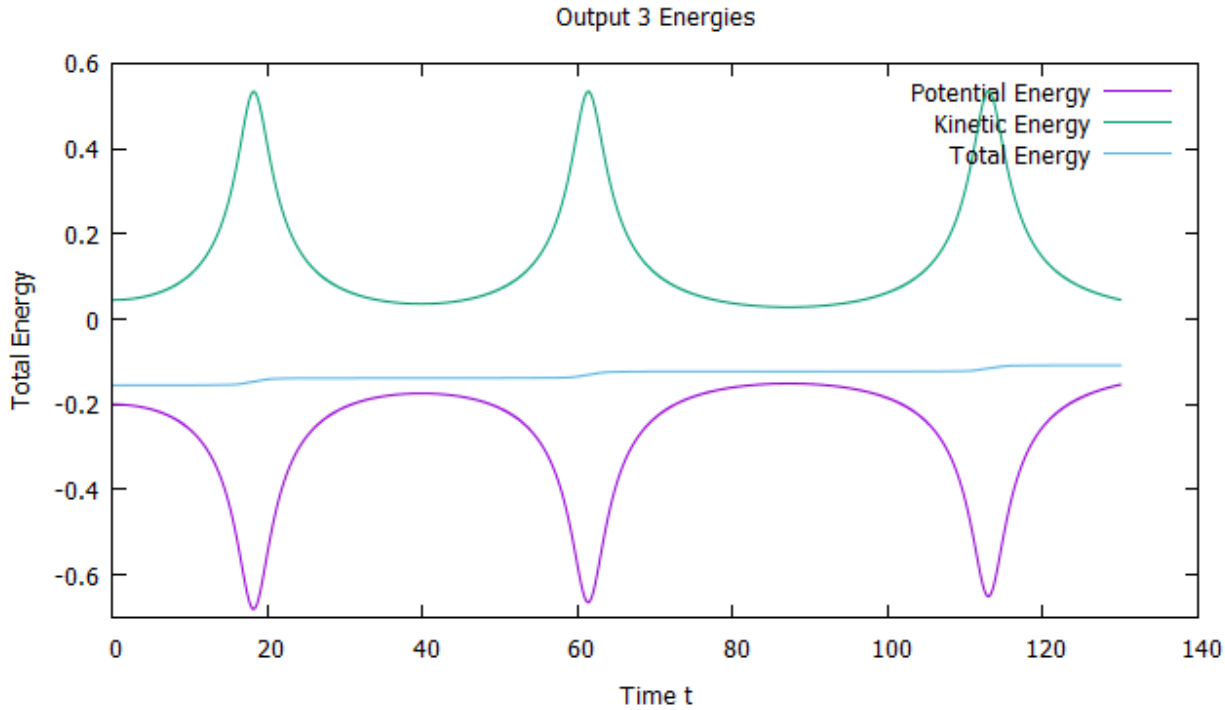
A:



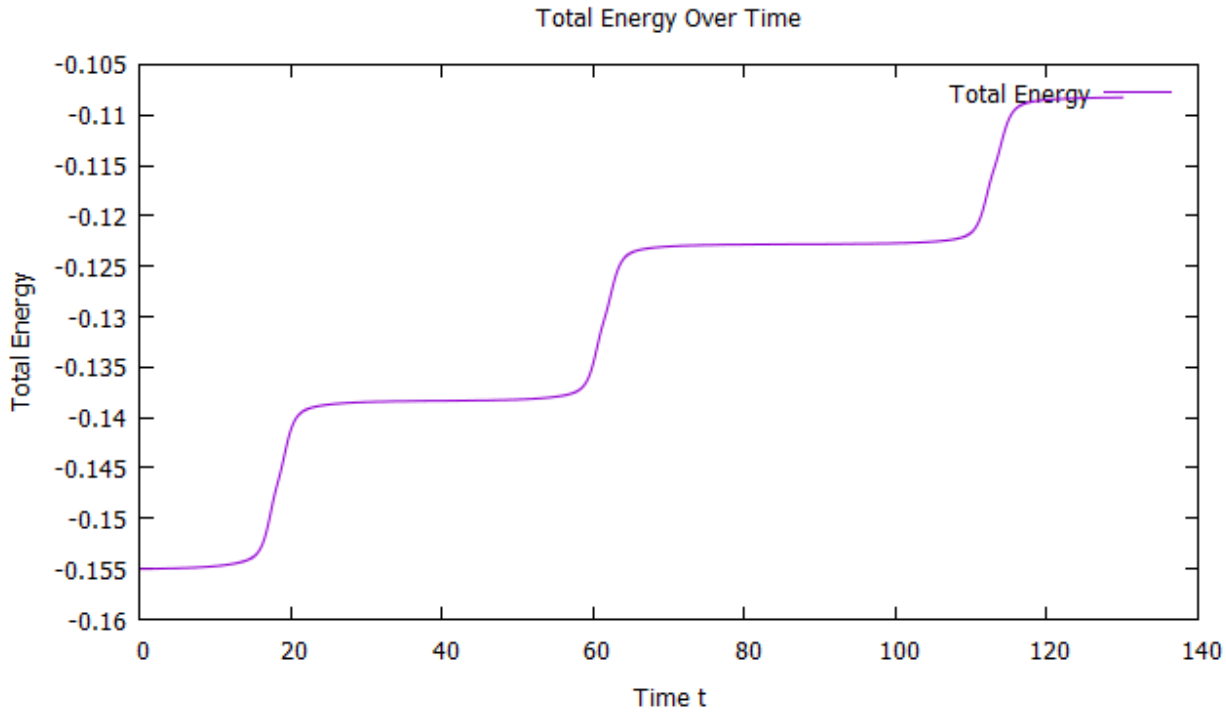
B:


x vs y: Output 3
x vs y: Output 4
Y
X
8
6
4
2
0
-2
-4
-6
-8
-6
-4
-2
0
2
4
6
8

C:


Output 3 Energies
Potential Energy
Kinetic Energy
Total Energy
Total Energy
Time t
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
0
20
40
60
80
100
120
140

D:



E:

Im not sure what to look for in the initial conditions for bounding orbits, but it seems like all the planets here were bound. Its easy to see from the graph of all energies in output 3 that the orbit would be bound because the energies are nearly canceling out, meaning we lose the same amount of energy that we gain, but that's not entirely true because the total energy over time is increasing, meaning that the orbit will get wider as time goes on, and we may even lose this planet later on.

There is a relationship of the potential energy and kinetic energy 'canceling each other out,' with a slightly higher amount of kinetic energy. Im sure if we were to see the energy graphs of the other planets, we would also end up with the same relationship.