Homework Assignment 4

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I PROBLEM 1

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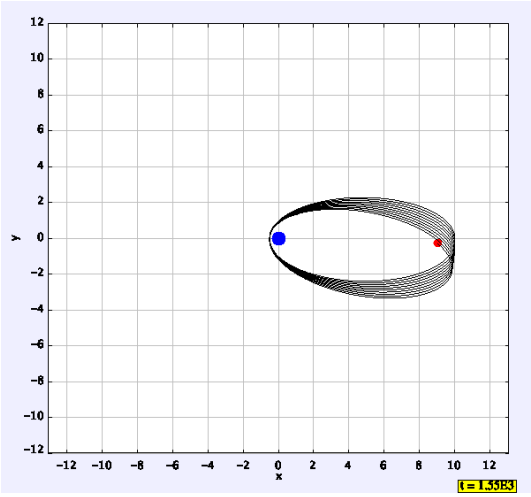
II PROBLEM 2

Part A.

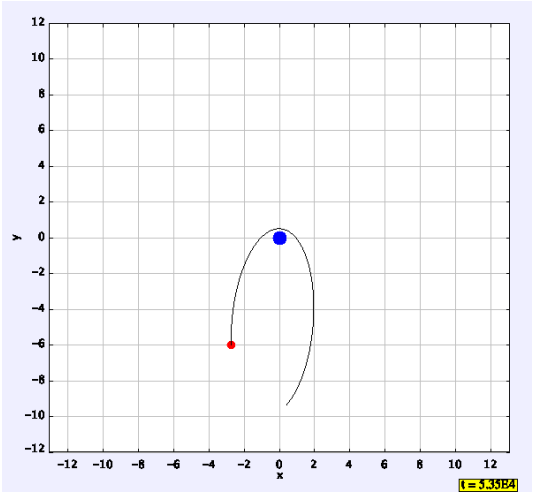
FIG. 1. 10 Periods



Part B.

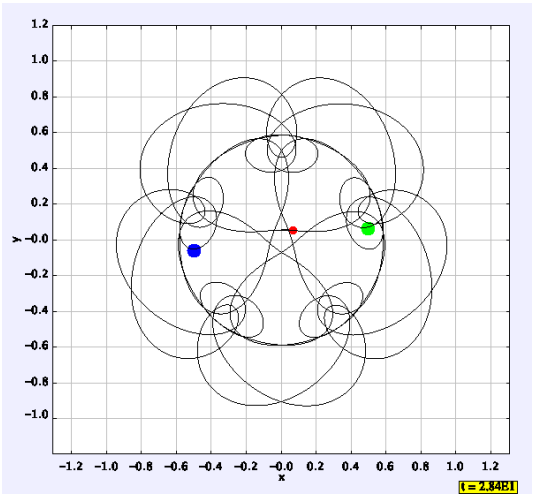
When we set $nspeed = 759$, the orbit starts to undergo rotation, meaning that the orbit doesn't precess; Rather, the elliptical orbit remains in the XY plane and rotates about the planet over time. When we set $dt = 0.2$, we observe orbital trajectory precession about the center of mass of the system.

FIG. 2. 6 O'Clock



III PROBLEM 3

FIG. 3. Closed Orbit



The period of the orbit is approximately $\boxed{\approx 28.4\,\mathrm{s}}$

IV PROBLEM 4

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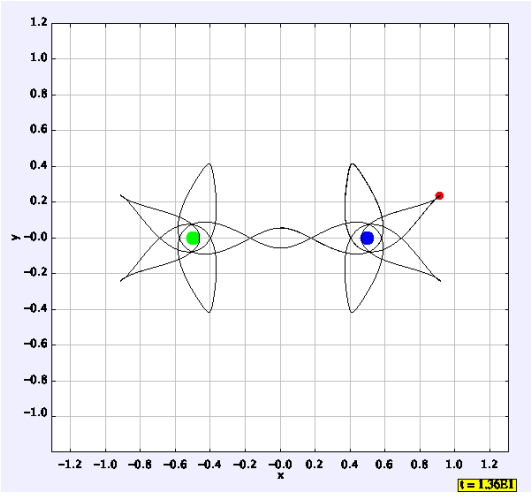
FIG. 4. Closed Orbit (Co-Rotating Frame)



V PROBLEM 5

FIG. 5. Chaotic Closed Orbit (Rotating Frame)

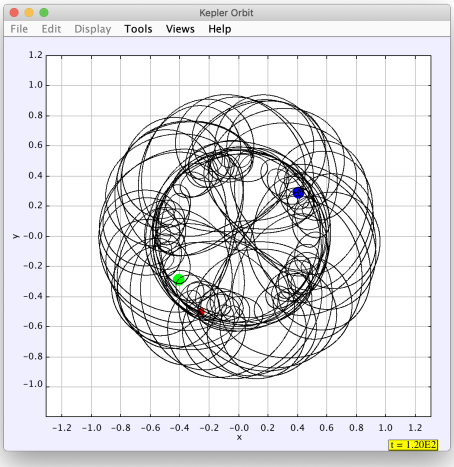


FIG. 6. Chaotic Closed Orbit Input Parameters