**PHYS 620 Classical Mechanics: Assignment 9**

Due 11/08/24

1. Consider motion of two bodies of mass $M$ and $m$ interacting gravitationally. Their trajectory in relative coordinates is $r(\phi) = c/(1 + \epsilon \cos \phi)$ with $c = 1$ and $\epsilon = 0.7$. Plot this function and then plot the corresponding trajectories in coordinates of the two bodies, $\boldsymbol{r}_1$ and $\boldsymbol{r}_2$ for bodies of masses $M$ and $m$, respectively, with $M/m$ mass ratios: 1, 3, 10, and $\infty$ (with $m$ constant). Assume that $c$ and $\epsilon$ are the same for all cases (since $c = (M + m)l^2/GM^2m^2$, where $l^2$ is angular momentum and $G$ is gravitational constant, $l$ had to be appropriately adjusted in each case).

2. Taylor: Problem 9.1.

3. Taylor: Problem 9.4.

4. Taylor: Problem 9.6.

5. Taylor: Problem 9.10.

6. Taylor: Problem 9.11.

7. Taylor: Problem 9.17.

8. Taylor: Problem 9.20.