AE 502 Project 1
Three-Body Problem

Due: May 1, 2021

Problem 1 (30%)
Using the equations of motion for the Circular Restricted Three-Body Problem (CRTBP), investigate different trajectories in the dynamical system by propagating ten sets of initial conditions (one set = $[x, y, z, \dot{x}, \dot{y}, \dot{z}]$). Find orbits around each of the primary bodies as well as around both bodies.

Problem 2 (30%)
Plot the zero velocity contours for various Jacobi constants in the Earth-Moon system and the Sun-Earth system. Discuss the results.

Problem 3 (40%)
Given the following initial conditions and period for a Halo orbit at L2 in the Earth-Moon system, compute the stable and unstable manifolds and plot them. See notes posted on the class website for details about how to compute manifolds.

μ =0.012150585609262
```
X0 = [1.118824382902157, 0.0, 0.014654873101278, 0.0, 0.180568501159703, 0.0]
P = 1.706067405636607;
```

Please submit your code and a report that contains the figures for each problem. Where required, please also submit comment on the results. Your report can be written in word or latex, either is fine.