EN.615.765.81.FA22 Chaos / Discussion Module 4

The equations that govern the three-body problem are:

In 2-D space, and , so these equations turn into six with :

To linearize the systems of equations, let and such that:

In general, the velocity ODEs are:

In order to find fixed points, the system of equations are set to and . As mass does not change, setting the equations to zero implies the conservation of momentum, i.e. remains constant. The MATLAB code has these ODEs listed as grav(mj,mk,xi,xj,xk,rij,rik), which xi and xj works for both and directions.

The other quantity that needs to be solved is position. This done by solving the ODEsin the form of:

For three particles in two dimensions, there are six position particles ODEs that need to be solved. This brings the total number of ODEs that need to be solved to twelve.