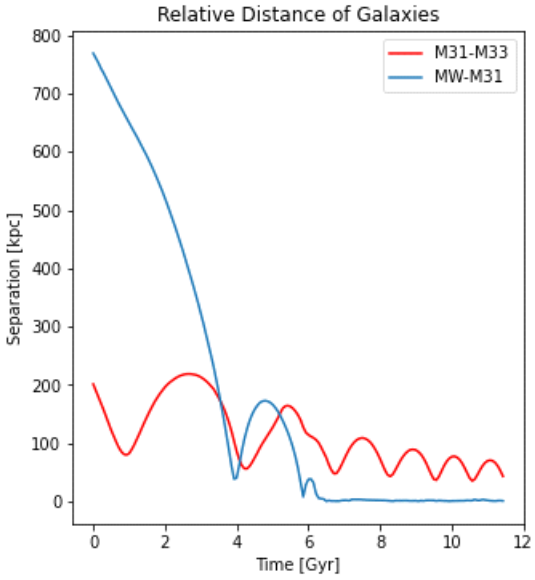
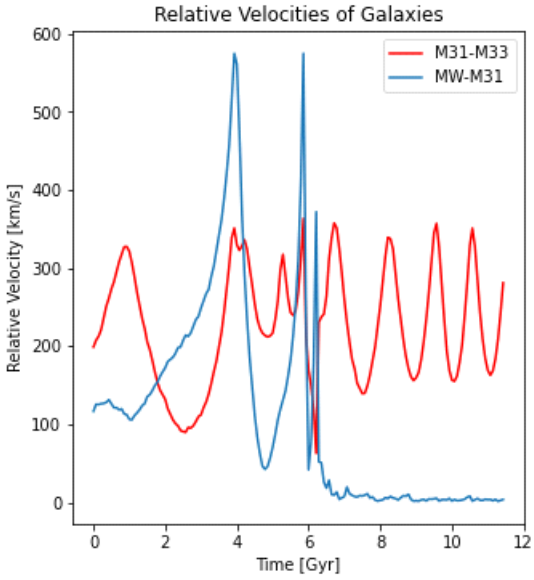
Homework 5 Questions/Plots

Wednesday, February 22, 2023 1:51 PM





1) From the above graph, the Milky Way and M31 will have 2 "close encounters" and then merge on their third approach to one another.
2) For the M33-M31 system, maximum velocities occur at minimum separations and vice versa. This shows oscillatory behavior, which is exactly what we would expect from a satellite body. This trend is also reflected in the M31-MW system, however the minima and maxima are much more dramatic and much less periodic.
3) M31 and the Milky Way merge in at t = 6.47 Gyr.
4) The decay rate is about .916666. After the merger, the COMs of M31 and the Milky Way reach separations of up to 3.4 kpc, so I will consider this to be the value at which M33 is considered merged. Based on a decay rate of .916666, it will take 35-36 orbits for M33 to merge with the merger remnant.