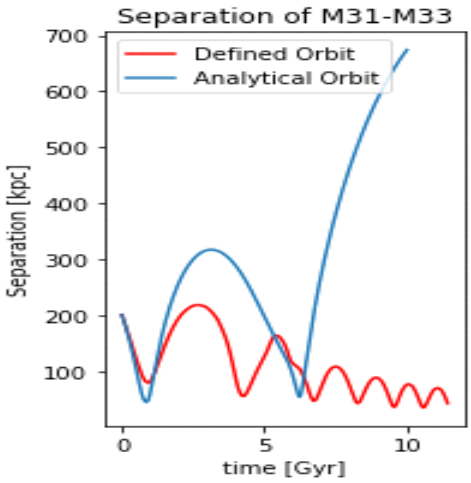
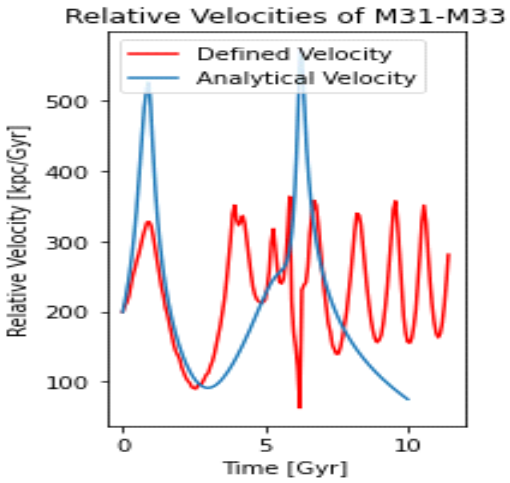
Homework 7

Thursday, March 23, 2023 9:37 PM

1)





2) I notice that they are very different from each other. For the integrated orbit, M31 takes much longer to return to periapsis and then shoots off in a much more distant orbit. Instead of decreasing in orbital radius, it tends to increase. The velocity similarly takes much longer to evolve analytically than from the .txt files. It reaches a much higher amplitude as well.
3) The addition of the Milky Way would drastically alter this simulation. It would cause a much more massive body to orbit about, which would have a stronger pull on M33 and cause it to orbit faster, as seen in the defined orbit.
4) You could add all the same functions for the MW-M33 system and then during the integration calculate the effects of acceleration from both galaxies. I don't think this would be the most efficient, though. It'd be more efficient to calculate these effects within each function.