

Week 2

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Reading

Including the Eccentricity of the Bodies

If you have not completed the Additional Reading from Week 1 ([Celestial Mechanics](#)), then now is the time. You should be able to come up with a way to find the velocities of two stars about the Center of Mass given the same parameters as before, but also including eccentricity.

There are 2 ways to do this, one is using a computer (see [below](#)) and another is using physics and some math, which is what you should attempt here.

Starting in the Center of Mass frame, can you find the expression for the velocity of the 2 stars as a function of time, their masses and eccentricity.

Additional Reading: Go through [Binary Stars: A cheat sheet](#) again, and make a small write-up of what you would want to do in this project. For example, you might be interested more in the eclipsing binaries as opposed to astrometric binaries. The things you want to do should be motivated by your interests, and what you want to accomplish by the end. The purpose of this is that you read through the material, and that we get a broad idea of how you want to proceed with the project.

Programming

1. Do the same calculation as above, starting from the equations of motion and solving them numerically. Verify the calculations.