Homework 2 Write-up

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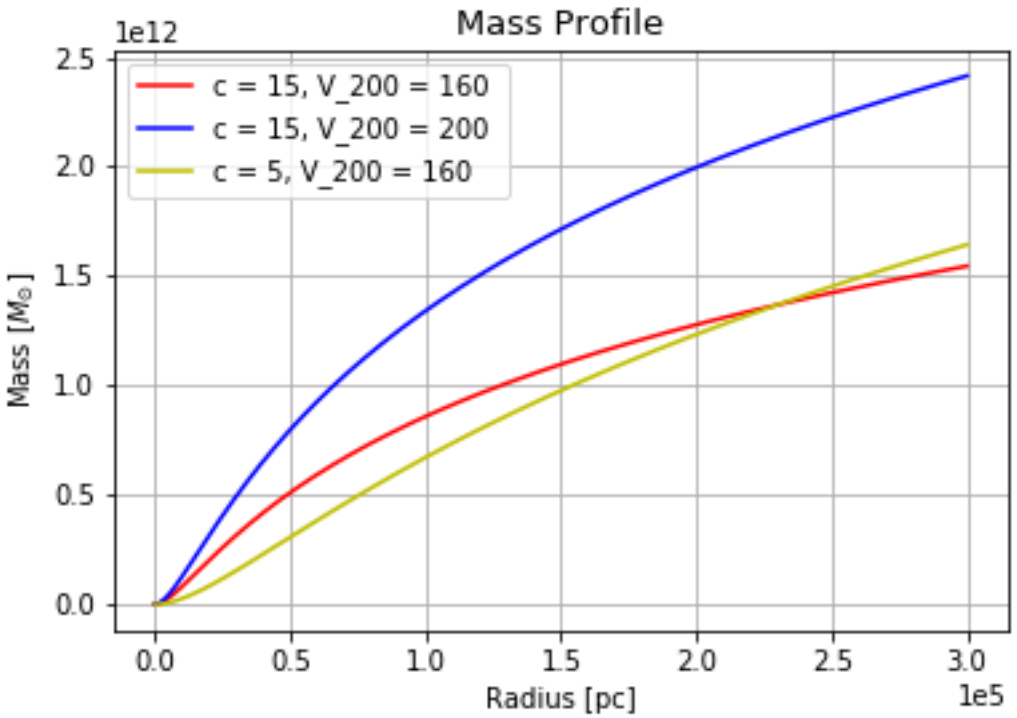
The first python file is a library of some numerical calculus processes including, a symmetric derivative function and three integration functions (midpoint rule, trapezoidal rule, and Simpson's rule).

For question 2, I plotted the enclosed mass as a function of the radius using the parameters $c = 15, v_{200} = 160km/s, r_{200} = 230$ kpc (or $2.3 * 10^5$ pc) and $G = 4.3 * 10^{-3}$. The enclosed mass was calculated using equation 2 and 3 from the homework write up, and includes both the mass of the dark matter halo and the rest of the mass of the galaxy. For a value of the radius the mass can be found using the function in the second code called Mass enclosure q2 hw2.py. Below is the mass profile:



By changing the values of v_{200} and c and keeping the other values the same, we can see how the relationship these values have with the mass and the radius and how they can affect the curve of the mass profile. The value of v_{200} changes the mass more drastically then the value of c. The value of v_{200} changes the height of the curve while changing c changes the steepness of it.

The third code is a class of matrix operations that will be useful for future assignments that include addition and multiplication of matrices as well as calculating the transpose, the trace, the inverse, the determinate and the LU decomposition.