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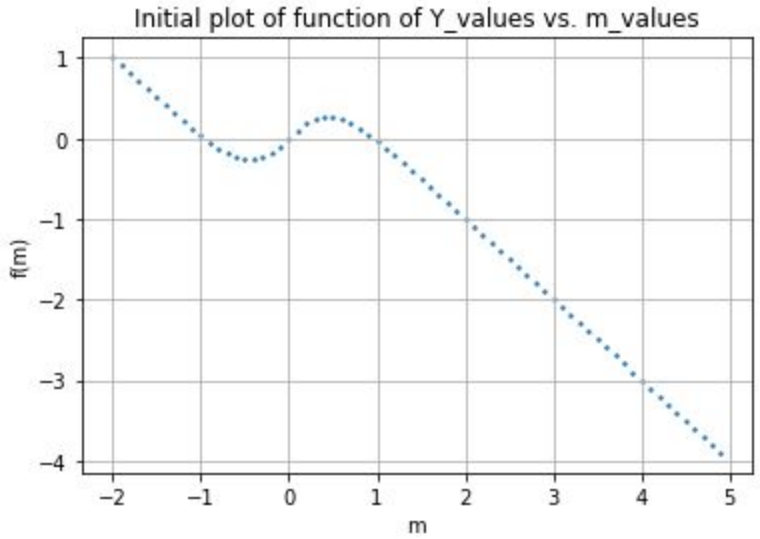
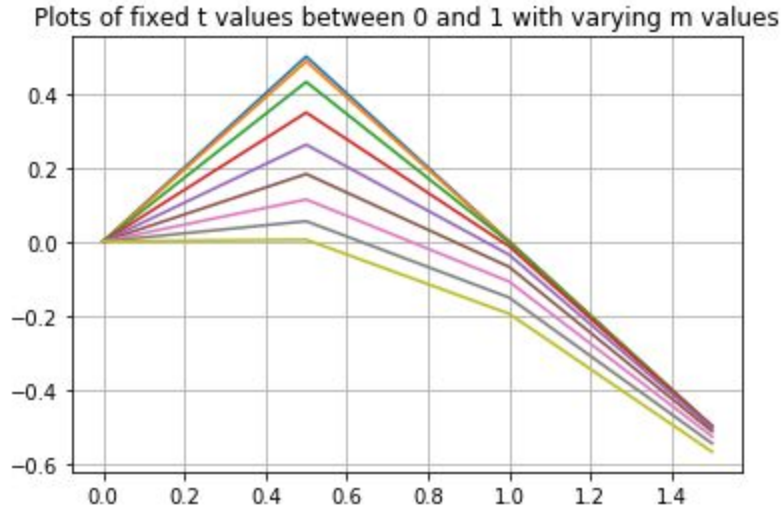
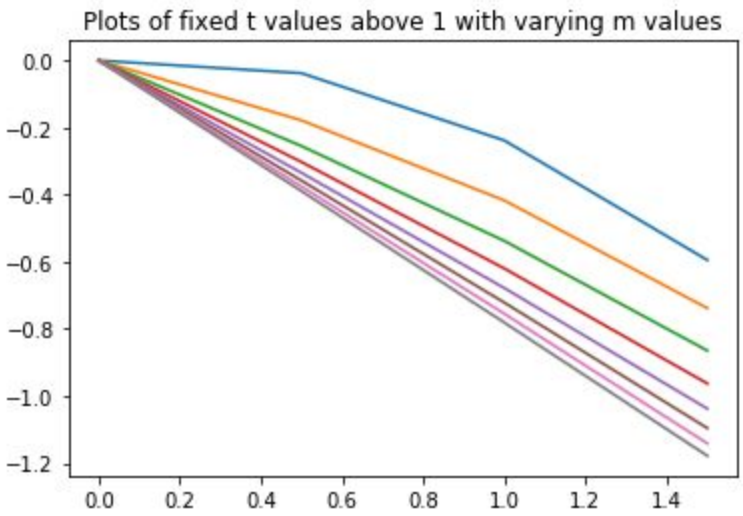
Computational
Exercise 16
Temperature Dependance of Magnetization

Initially plotting the function in which to find the roots and determine m(t) in terms of t we have the graph below with the initial guess of t= 0.5.



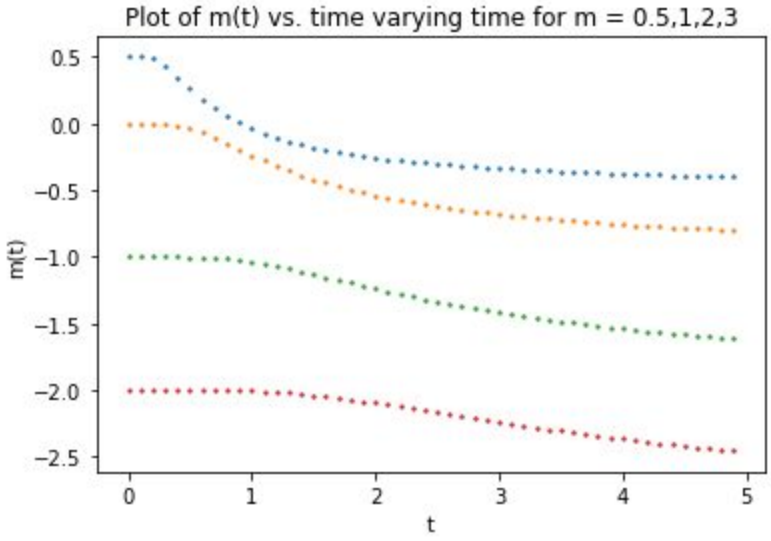
Here we can see that the root should be in a range around 1. We can compare the plots of varying the time between 0 and 1 and then above the value of one.





After computing the root with the bisection method and the Newton/Raphson method we have the results below. This does indicate as expected, the root is near 1.

Root from Bisection method: 0.9575040240761155
Root from Newton/Raphson method: 0.9575040240772764
Interesting results with fixed m and varying t, below. You can visually see with m greater than 1, there is not a root.



According to the timestamps, it seems the bisection method is faster. This is surprising to me since this is the method that is guaranteed to converge and could take extra time to do so. I expected the opposite result.

Insert result from running code at school… better internet

Below are a few plots of m(t) varying t, and you can see that m > 1, there is not a root value to the function, all values lie below zero. When constructing the plot, all of the lines lie on top of each other and the time value never goes above 1.4, even with the range set from 0 to 10.