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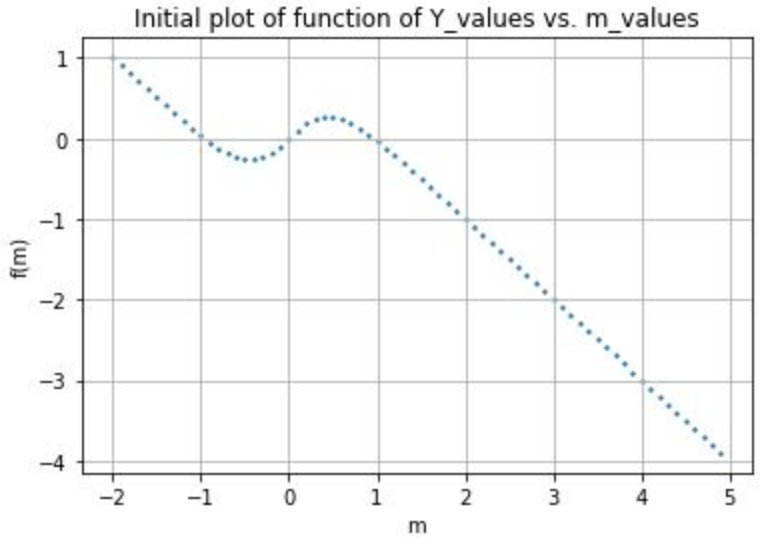
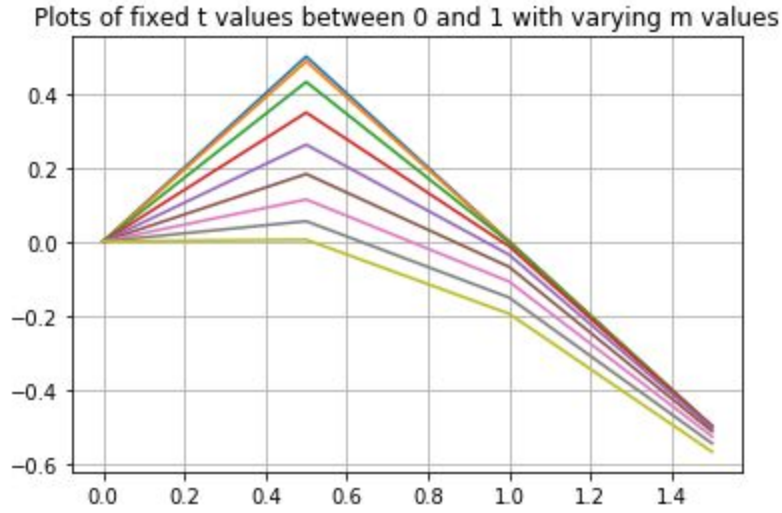
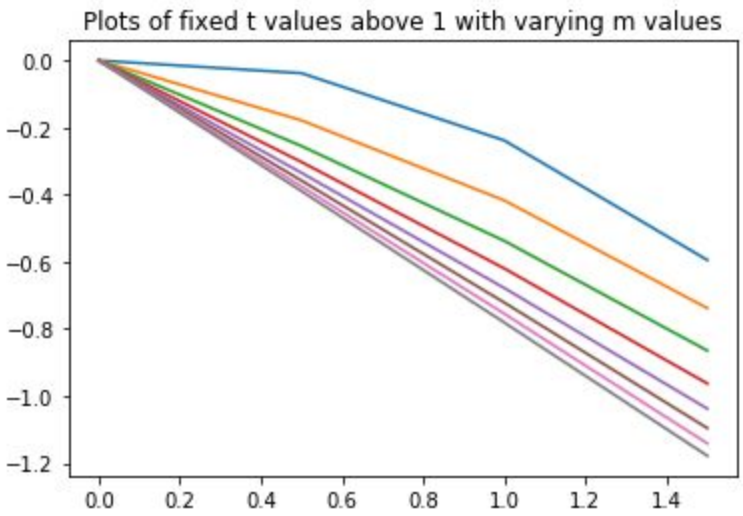
Computational
Exercise 16
Temperature Dependance of Magnetization

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.



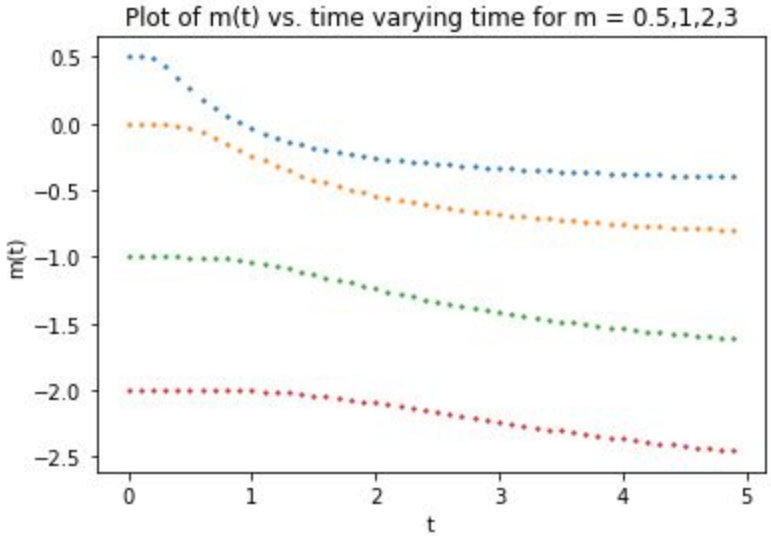
Here we can see that the root should be in a range around 1. We can compare the plots of varying the time between 0 and 1 and then above the value of one.





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.

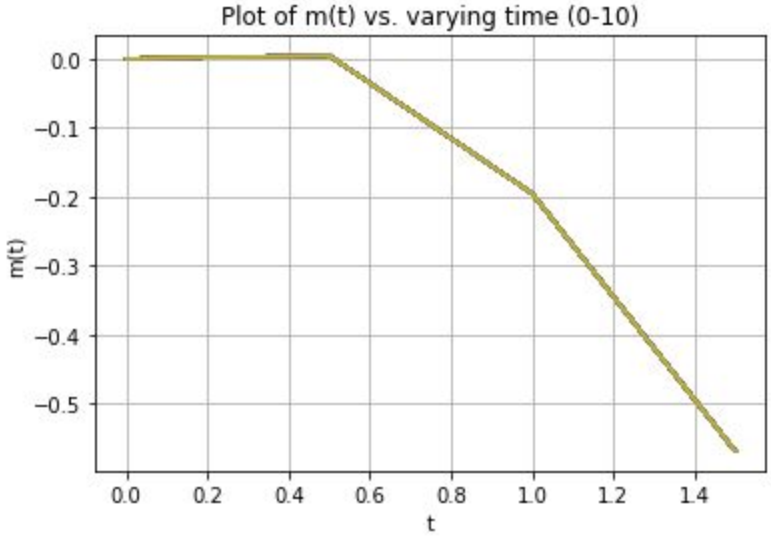
Root from Bisection method: 0.9575040240761155
Root from Newton/Raphson method: 0.9575040240772764
Interesting results with fixed m and varying t, below. You can visually see with m greater than 1, there is not a root.



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.



How does this relate to the evidence of seafloor spreading?

With tectonic plate activity, the plates move apart, but the molten rock from below will actually rise up to fill the gap so to speak. THis molten rock is much hotter that the surrounding water/rock of the seafloor. This will lead/allow to the magnetic dipole moments in the molecules to align themselves with the external magnetic fields of the Earth, which will result in a permanent magnetic for the rock. Over time, the Earth's magnetic field varies (moves and shifts, and swaps orientation). This can be seen with the swapping of the orientation of permanent magnetic rocks on the seafloor for example near the Mid Atlantic Ridge.