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Math561

Homework 3 - Problem 2 pt. d

**Honesty Pledge**:

I, Trevor Cargile, pledge that this program is completely my own work, and that I did not take, borrow or steal code from any other person, and that I did not allow any other person to use, have, borrow or steal portions of my code. I understand that if I violate this honesty pledge, I am subject to disciplinary action pursuant to the appropriate sections of the San Diego State University Policies.

Out of the three methods used in problem 2, the fixed point iteration method is the simplest method to use. By simply inputting the output of the previous iteration, the fixed point can be approximated after a certain amount of iterations. But, compared to other methods, the fixed point method is really slow, which means the convergence of the method takes awhile. Compared to the Steffensen's method, the fixed point method took 4 times as many iterations before it got in the correct threshold for the root.

The Steffensen's method seemed quite complex and got to the answer fairly quickly. There wasn't much work involved besides using the Aitken's acceleration correction equation around 3 times and using fixed point iteration twice for each Aitken's calculation. One downside to this method would be the fact that if the equation isn't three times differentiable then this method can be thrown out the window. However, Steffensen's method can generate precise roots digits faster than most other methods.

Newton's method usually converges really quickly as well. The only downside to this method is that you have to calculate the derivative of the equation which can be really expensive if you are dealing with a complex equation. But, the fact that it converges quickly usually outweighs the downside of it being expensive. In this case the convergence of the newton's method took 8 iteration, which was more than the Steffensen's method.