Assignment 4

Math 383L Fall 2022

Due 9/27 (Before Class)

1 Bisection Method: Matlab

(a) Write a function to find the root of an arbitrary function $f(x)$ using the Bisection Method. Define some tolerance level for the difference between consecutive terms and an upper number of iterations to use.

(b) Find the root of $f(x) = x^2 - 2$ with $a = 1$ and $b = 2$ with $tol = 10^{-8}$ and at each iteration keep track of the error $|c - c_n|$.

(c) Plot the graph of iteration number vs log(error). What is the slope of the line (approximately)?

(d) Repeat the above steps but for $f(x) = \frac{1}{10}x^6 - 5x^3 + 6x - 1$ with $a = 3$ and $b = 4$ with $tol = 10^{-8}$. (Note, to find c I would do the Wolfram Alpha part below first).

2 Bisection Method: Wolfram Alpha

(a) Find all of the roots for both functions above using https://www.wolframalpha.com/