PHYSICS 102
CLASSICAL MECHANICS LAB
FALL 2016

Assignment One

Due Tuesday, October 11, 7:00 pm.

[1.] Write a code which uses Newton's method to solve $x^2 - 3 = 0$.

Run your code. Start from the initial guess $x_0 = 1$. How many iterations does it take before you get the exact answer to five decimal places?

Run your code. Start from the initial guess $x_0 = 100$. How many iterations does it take before you get the exact answer to five decimal places?

[2.] Write a code which uses Newton's method to solve $xe^x - 8 = 0$. How different was this code from [1], eg how many lines of [1] did you need to change to do [2]?

Run your code. Start from the initial guess $x_0 = 1$. How many iterations does it take before you get the exact answer to five decimal places?

Run your code. Start from the initial guess $x_0 = 100$. How many iterations does it take before you get the exact answer to five decimal places? Why does Newton's method converge so much more slowly than it did in problem 3?

[3.] Write a code which solves $xe^x - 8 = 0$ by the bisection method. Which method is better for finding roots, Newton or bisection?