ESO 208A: Computational Methods in Engineering

Tutorial 2

Round-off error

1. Consider the following function, where x is very large

$$f(x) = \sqrt{(x+1)} - \sqrt{x}$$

i. Calculate condition number for the problem.
ii. Estimate the value of the function for $x = 208208$ by performing operations with six significant digits and calculate the corresponding relative error.
iii. How can we reduce the relative error?

Solution of Nonlinear equation

1. Find a solution in [0.1 1] for

$$f(x) = 600x^4 - 550x^3 + 200x^2 - 20x - 1 = 0$$

using the following methods;

(a) Bisection method;

(b) False-position method;

(c) Modified false-position method;

Perform eight iterations for each method or stop if the approximate error is less than 0.05%. Comment on the convergence rate. Which is the best and the worst algorithm for the function?