ESO 208A: Computational Methods in Engineering

Tutorial 2

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;

(d) Newton-Raphson method [use 0.5 as the guess value];

(e) Secant method [use 0.1 and 1.0 for starting the iterations].

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?

Solution of system of Nonlinear equation

2. Solve the following equations using (a) fixed-point iteration and (b) Newton-Raphson method, starting with an initial guess of x=1.2 and y=1.2

$$u(x, y) = x^2 - x + y - 0.75 = 0$$
$$v(x, y) = x^2 - 5xy - y = 0$$