Numerical Methods in Engineering

Assignment #4 - Newton-Raphson method for nonlinear system

1. Using Newton-Raphson Method solve the systems of nonlinear equations (tollerance is 1e-4) in PYTHON.

- Define initial guesses of the roots using graphical representation.

- Comment each line in your codes.

- Plot equations in the same window

- Plot roots in the same window

- Print numerical values of roots on the screen

- Check your results

- Define the number of iterations

$$\begin{cases} x^2 - y + x\cos(\pi x) = 0 \\ yx + e^{-x} - x^{-1} = 0 \end{cases}$$

2. Using the Newton's Method, write a script to solve the following nonlinear system of equations. Unitial guess for (x,y,z)=(1,1,0), tollerance is 1e-7 and maximum number of iterations is 50.

$$\begin{cases} 2x + y = 5 - 2z^2 \\ y^3 + 4z = 4 \\ xy + z = e^z \end{cases}$$

- Print the roots on the screen;

- Check your results;

- Define the number of iterations.