Numerical Methods – Spring '18

PA #4

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Programming Assignment #4

Problem 1:

Consider the nonlinear system of equations:

$$e^{Ax} + y - 0.5y^2 - 2.5 = 0$$
$$By - 4\cos\left(3\sqrt{x}\right) = 0$$

Create a MATLAB function that accepts a value of A, a value of B, a row vector containing initial guesses for x and y, and an error tolerance & implements the Newton-Raphson method of root finding to return at least one solution to the system if there is one. Check for divergence and return the appropriate root if no solution is found.

My Solution:

See leurodriguez1.m

Problem 2:

Modify your code from Problem 1 to check and see if there are multiple solutions for a given A and B. If there are, return as many of them as you can find.

My Solution:

See leurodriguez2.m

Problem 3:

Linearize the model $y = axe^{bx}$ and use linear regression to find the best a and b for the given model and calculate the correlation coefficient based on the modeled data.

My Solution:

See leurodriguez3.m