

Numerical Analysis: Homework #7

Due on May 4, 2015

Professor Mohler MWF 2:15

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Problem 1

Consider the nonlinear system

$$\begin{aligned}5x^2 - x^2 &= 0 \\x_2 - (\sin(x_1) + \cos(x_2))/4 &= 0\end{aligned}$$

- a) Find a function $G(\vec{x})$ and a set D in \mathbb{R}^2 such that G has a unique fixed point in D .
- b) Estimate the number of iterations required to approximate the exact solution within 10^{-5} in the $\|\cdot\|_\infty$ norm, give many initial guess in D .

Problem 2

Use two iterations of Newton's method with initial guess $vec0$ to approximate the solution to

$$\begin{aligned}3x - \cos(yz) - 1/2 &= 0 \\4x^2 - 625y^2 + 2y - 1 &= 0 \\e^{-xy} + 20z + \frac{10\pi - 3}{3} &= 0\end{aligned}$$