Written HW 2

1 Problem 1

Estimate the error e_{i+1} in terms of the previous error e_i as Newton's Method converges to the given roots. Is the convergence linear or quadratic?

$$32x^3 - 32x^2 - 6x + 9 = 0; r = -1/2, r = 3/4$$

2 Problem 2

Use the approximate operation count $2n^3/3$ for Gaussian elimination to estimate how much longer it takes to solve n equations in n unknowns if n is tripled.

3 Problem 3

Assume that a given computer requires 0.002 seconds to complete back substitution on a 4000×4000 upper triangular matrix equation. Estimate the time needed to solve a general system of 9000 equations in 9000 unknowns. Round your answer to the nearest second.

4 Problem 4

Find the LU factorization of the given matrix using Gauss elimination. Check by matrix multiplication

$$\begin{bmatrix} 3 & 1 & 2 \\ 6 & 3 & 4 \\ 3 & 1 & 5 \end{bmatrix}$$