

Name of the Student: _____ KSU ID: _____

Questions: (3+2+5)

Consider the linear system $Ax = b$ with $A = \begin{bmatrix} 3 & \frac{1}{3} \\ 6 & -4 \end{bmatrix}$ and $b = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$

- (1) Find inverse of A by Gauss-Elimination with Partial Pivoting. Use the inverse of A to find solution of the linear system.
- (2) Find determinant of matrix A using LU decomposition by Crout method.
- (3) Consider the linear system $Ax = b$ with $A = \begin{bmatrix} 3 & \frac{1}{3} \\ 2 & -6 \end{bmatrix}$ and $b = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$.

Find $x^{(1)}$ using the matrix form of Jacobi's iterative method starting with $x^{(0)} = [-1, -2]^T$. Find the error bounds for $\|x - x^{(4)}\|$. Find the number of iterations N of the Jacobi method required to satisfy the error tolerance $\epsilon = 10^{-2}$. Use the EB formula

$$\|x - x^{(N)}\|_{\infty} \leq \frac{\|T\|_{\infty}^N}{1 - \|T\|_{\infty}} \|x^{(1)} - x^{(0)}\|_{\infty}$$

— Good Luck —

Start your solutions from here