

University of Peradeniya

Faculty of Engineering

Department of Engineering Mathematics

**NUMERICAL METHODS (EM 215)**

Solutions to system of linear equations

**Assignment 1(SLE)**

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1) Consider the system of linear equations given by,

$$\begin{array}{rrcrcl} x_1 & + & 2x_2 & - & 12x_3 & + & 8x_4 & = & 27 \\ 3x_1 & + & 4x_2 & + & 7x_3 & - & 2x_4 & = & 4 \\ -3x_1 & + & 7x_2 & + & 9x_3 & + & 5x_4 & = & 11 \\ 6x_1 & - & 12x_2 & - & 8x_3 & + & 3x_4 & = & 49 \end{array}$$

Solve the above system using,

(a) Gaussian elimination with pivoting.

(b) LU decomposition with pivoting.

2) Consider the system of linear equations given by,

$$\begin{array}{rrcrcl} 5x_1 & + & 10x_2 & + & 3x_3 & + & x_4 & = & 6.7 \\ 6x_1 & + & 7x_2 & + & 20x_3 & - & x_4 & = & 5.8 \\ 12x_1 & + & 2x_2 & + & 3x_3 & - & 30x_4 & = & 4.3 \\ 15x_1 & - & x_2 & + & x_3 & + & x_4 & = & 2.1 \end{array}$$

Construct a computer program to find the solution to the above linear system using,

(a) Jacobi method.

(b) Gauss-Seidel method.

and find the solution in (a) & (b).

**Note:** You may use Python/ Matlab to construct the computer program.

