

COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering

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Course Title: Advanced Engineering Mathematics

Course No.: EC760

Problem Set #1

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Gaussian Elimination

1. Solve the following system of linear equations using Gaussian Elimination:

$$5y_1 = 10$$

$$3y_1 - 4y_2 = 11$$

$$y_2 - \frac{5}{6}y_3 = 5$$

$$-y_1 + 2y_2 - \frac{7}{6}y_3 - \frac{34}{5}y_4 = 14$$

2. Repeat Q1 using LU factorization

3. Show by example that if the RHS is changed to new values, such as:

$$\mathbf{r} = [-8, 0, 0, 1]^T,$$

then, the equations can still be solved without any new calculation of the \mathbf{L} and \mathbf{U} matrices (only forward and backwards substitution).

Hint: You will need to use Gaussian Elimination to show that the result is correct