FEEDBACK AND CONTROL SYSTEMS

LABORATORY ACTIVITY #2

INTRODUCTION TO MATLAB: MATLAB VECTORS, MATRICES AND FUNCTIONS

I. Learning Outcomes:

At the end of the laboratory activity, the students should be able to:

1. Use MATLAB/SCILAB in solving matrix operations.

II. Laboratory Exercises:

Provide screenshots of the code and output performed in MATLAB or SCILAB. Every screenshot should have your name as a comment in the code.

1. Use MATLAB/SCILAB command to obtain the following:
   a. Extract the fourth row of the matrix generated by magic(6).
   b. Show the results of 'x' multiply by 'y' and 'y' divides by 'x'.
      Given x = [0:0.1:1.1] and y = [10:21]

2. Generate random matrix 'r' of size 4 by 5 with number varying between -8 and 9.

3. In MATLAB/SCILAB, enter the following matrices using the appropriate format. Use ***rats(n)*** for a rational output.

$$A = \begin{bmatrix} 1 & 1/2 \\ 1/3 & 1/4 \\ 1/5 & 1/6 \end{bmatrix} \qquad B = [5 \quad -2] \qquad C = \begin{bmatrix} 4 & 5/4 & 9/4 \\ 5 & 6 & 7 \end{bmatrix}$$

   a. Provide the syntax for matrices A, B and C.
   b. Matrix multiplication for A and C.
   c. Sum of A and transpose of C.
   d. Six times of transpose of A subtracted to twice of C.
   e. Product of A and its transpose.

4. Solve the values of x, y and z using matrices in MATLAB/SCILAB.

$$7x + 5y - 3z = 16$$
$$3x - 5y + 2z = -8$$
$$5x + 3y - 7z = 0$$

5. Create a MATLAB/SCILAB function to compute the volume and surface area of a cylinder using radius and height as input parameters.