ESE-3014 Lab2 - Introduction to MATLAB

Theory

MATLAB stands for Matrix Laboratory. It is a multipurpose software suite for numerical computing. MATLAB allows matrix manipulation, plotting of functions and data, implementation of algorithms and can interface with other programming languages. MATLAB is an interactive, matrix-based system for scientific and engineering numeric computation and visualization. It allows for the computation of complex numerical problems and their solutions in a fraction of the time required in other programming languages.

Lab

1. Create a 2D plot of the sine function between 0 and 2π.

2. Create a 3D plot of a surface by creating a grid along the X and Y axes and plotting the Z-coordinate according to the exponential function.

3. Write a script to apply if and if-else statements.

4. Write a script to apply conditional logic switch.

5. Write a script to perform loop with a while condition.

6. Write a script to plot a vector of random data. Draw a horizontal line at the mean. Save the script and run it from the command line.

7. Write a script that calculates the mean of five samples of data from a vector of random data. Calculate the overall mean. Use a for loop to perform the calculations. For each iteration of the loop print out the intermediate results. Use an if..else control block to display the results depending on whether the mean of the samples is less than, greater than or equal to the overall mean.

8. Create a function that calculates the area of a circle with the radius as input in command window. Call this function from the MATLAB command line or in a MATLAB script (.m).

9. Create a function that calculates the sum of an arbitrary number of sinusoidal terms. Call this function from the MATLAB command line or in a MATLAB script (.m).