الجامعة الإسلامية العالمية شيتاغونغ
International Islamic University Chittagong

Department of Computer and Communication Engineering

LAB REPORT

Experiment No : 01
Experiment Name: Introduction to MATLAB Software.

Course Title : Digital Signal Processing Sessional
Course Code : CCE-3602

Submitted By

Name : Ahsanul Karim Tanim
ID No. : E221013
Semester : 6th
Section : A

Date of Experiment:

Date of Submission:

Remark

Submitted To

Dr. Engr. Abdul Gafur
Associate Professor, Dept. of ETE, IIUC

Experiment No: 01

Experiment Name: Introduction to MATLAB Software.

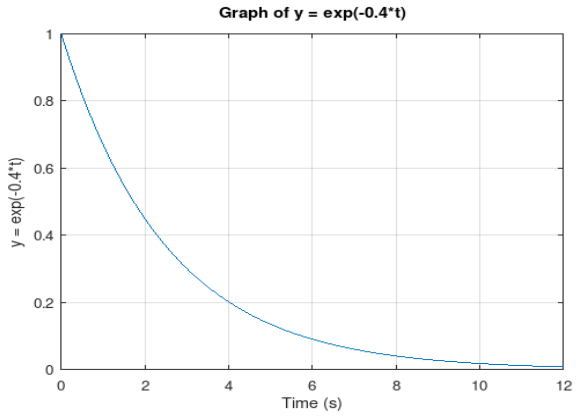
Objectives:

- To learn the basic interface and functionalities of MATLAB.
- To practice writing and executing basic mathematical equations in MATLAB.
- To explore the use of MATLAB for solving mathematical problems.

Theory: MATLAB (Matrix Laboratory) is a high-performance language used primarily for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB is built around the concept of manipulating matrices. MATLAB can visualize data in 2D and 3D through a variety of plot types.

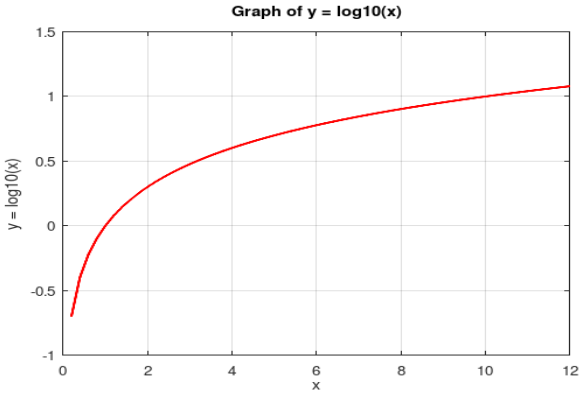
Equation1: Exponential Decay

```
t = 0:0.2:12;  y = exp(-0.4*t);  plot(t, y);
xlabel('Time (s)'); ylabel('y = exp(-0.4*t)');
title('Graph of y = exp(-0.4*t)');
grid on;
```



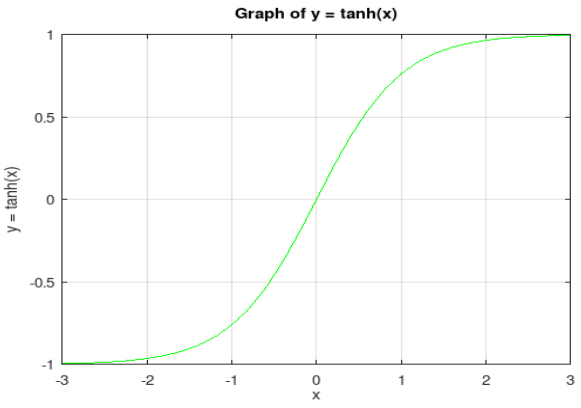
Equation2: Logarithmic Function

```
x = 0.2:0.2:12; y = log10(x); plot(x, y, 'r');
xlabel('x'); ylabel('y = log10(x)');
title('Graph of y = log10(x)');
grid on;
```



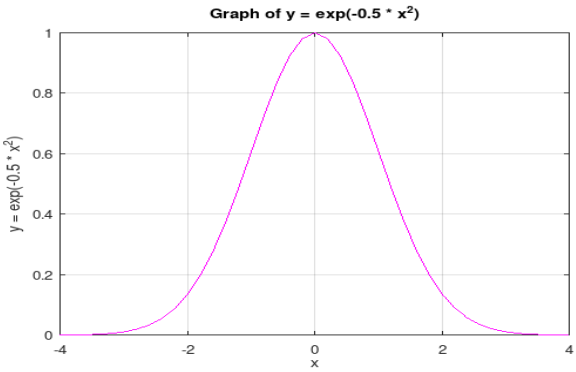
Equation3: Tangent Wave

```
x = -3:0.2:3; y = tanh(x); plot(x, y, 'g');
xlabel('x'); ylabel('y = tanh(x)');
title('Graph of y = tanh(x)');
grid on;
```



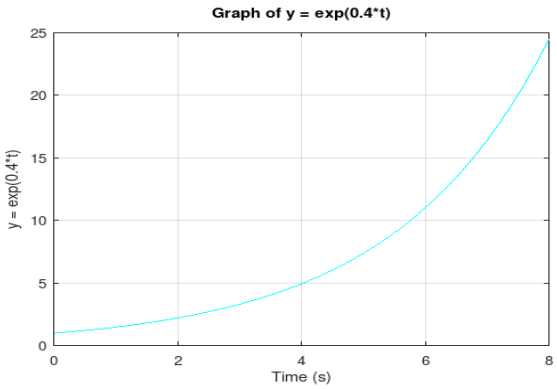
Equation4: Gaussian Function

```
x = -4:0.2:4; y = exp(-0.5 * x.^2); plot(x, y, 'm');
xlabel('x'); ylabel('y = exp(-0.5 * x^2)');
title('Graph of y = exp(-0.5 * x^2)');
grid on;
```



Equation5: Exponential Growth

```
t = 0:0.2:8; y = exp(0.4 * t); plot(t, y, 'c');
xlabel('Time (s)'); ylabel('y = exp(0.4*t)');
title('Graph of y = exp(0.4*t)');
grid on;
```



Discussion: In this lab, we used MATLAB to solve and visualize various mathematical equations. We began with the exponential decay function y=exp(−0.5·t), which demonstrated how values decrease rapidly at first and then slow down over time. Next, the logarithmic function y=log(x) showed rapid growth for small values of x, with slower growth as x increases. The hyperbolic tangent function y=tanh(x) provided a smooth transition between -1 and 1, which is useful for generating bounded outputs. The Gaussian function y=exp(−x2) illustrated the normal distribution with its characteristic bell curve. Finally, the exponential growth function y=exp(0.5·t) displayed rapid increases over time, often seen in phenomena like population growth.