

University of Bahrain

College of Information Technology

Department of Computer Engineering

Experiment 1

**Prepared By**

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**Sec: 01**

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**Introduction to MATLAB**

**Objective:**

The objective of this lab is to know how to use MATLAB

**What is MATLAB?**

MATLAB® is a high-performance language 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.

Typical uses include:

 Math and computation

 Algorithm development

 Data acquisition Modeling, simulation, and prototyping

 Data analysis, exploration, and visualization

 Scientific and engineering graphics

 Application development, including graphical user interface building

MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non-interactive language such as C or FORTRAN.

The name MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software developed by the LINPACK and EISPACK projects.

Today, MATLAB engines incorporate the LAPACK and BLAS libraries, embedding the state of the art in software for matrix computation.

MATLAB has evolved over a period of years with input from many users. In university environments, it is the standard instructional tool for introductory and advanced courses in mathematics, engineering, and science. In industry, MATLAB is the tool of choice for high-productivity research, development, and analysis.

MATLAB features a family of add-on application-specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes allow you to learn and apply specialized technology. Toolboxes are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems. Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, wavelets, simulation, and many others.

**Report**

1- Consider the following 8x8 input block:

A= [450 150 350 200 125 134 32 150

250 250 150 200 123 134 32 50

130 50 250 100 120 10 32 50

50 15 250 120 123 13 32 150

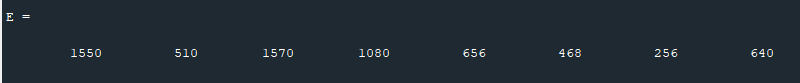
220 15 250 200 120 14 32 20

250 10 50 40 13 134 32 40

50 10 20 20 12 13 32 30

150 10 250 200 20 16 32 150]

2- Calculate the sum of matrix A.



3- Calculate the DCT matrix A.

A screenshot of a computer

Description automatically generated with medium confidence

4- Plot the function y = sin(x) + x - x cos(x) in two separate figures for the intervals: 0 < x < 30 and 100 < x < 100. Add a title and axes description.

5- Plot a circle with the radius r = 2, knowing that the parametric equation of a circle is [x(t), y(t)] = [r cos(t); r sin(t)] for t = [0; 2pi].

6- Plot

X(t)=Ceat

C=0.5 , a=0.2

b- C=1 , a=0.2

c- C= 0.5, a=-0.2

d- C=1, a= -0.5

7- Plot :

a. Exp(0.5t) cos (2t+1)

b. Exp (-0.1t) cos (4t+1)

8- If x(t)=sin (2Π t) and y(t) = e-10t z= x(t) \* y(t)

Plot x(t), y(t), z(t)

9- If x(t) = exp(t)

Draw:

a. x(t)

b. x(-t)

c. exp(|t|)

d. exp(-|t|)

**Conclusion:**

In this lab I learned a lot of things which are

* How get the frequency of the response
* How to get the get resonance
* How to get the bandwidth
* How to compare with the result in theory