Experiment Details

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| Department Name | Electronics and Telecommunication Engineering |
| Class | T.Y. |
| Semester | V |
| Subject Name | Programming Lab |
| Experiment No. | 01 |
| Experiment Name | Study of Matrix Manipulation |

Version History

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| --- | --- | --- | --- | --- |
| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.0 | Rani Arun Bhendigeri | Mrs. V. A. Suryawanshi | DD/MM/YYYY |
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AIM:

To understand basic features and built in functions available in MATLAB.

THEORY:

MATLAB, which stands for **MAT**rix **LAB**oratory, is a state-of-the-art mathematical software package, which is used extensively in both academia and industry. It is an interactive program for numerical computation and data visualization, which along with its programming capabilities provides a very useful tool for almost all areas of science and engineering. It remains however, one of the leading software packages for numerical computation. As you might guess from its name, MATLAB deals mainly with matrices. A scalar is a 1-by-1 matrix and a row vector of length say 5, is a 1-by-5 matrix. One of the many advantages of MATLAB is the natural notation used. It looks a lot like the notation that you encounter in a linear algebra. This makes the use of the program very easy and its makes MATLAB a natural choice for numerical computations. The purpose of this experiment is to familiarize MATLAB, by introducing the basic features and commands.

**Matrices:**

Row matrix: Elements in a row are separated either by using spaces or commas eg: a= [1 2 4 5] OR a= [1, 2, 4, 5]

Column matrix: Elements which differ by a column are separated by semicolon eg: b= [1; 2; 3]

**Looking into matrix:**

a(row, column) allows to look the particular element in the matrix “a”

**Vectors:**

d= [0:7]

”d” is a vector or row vector with first element as 0 & last element as 7 & increment is by default 1.

The default increment can be changed (to 0.1) by using increment field in between as e= [0:0.1:7].

d(1:2) allows to look into vector with increment 1 e(1:2:4) look with increment with increment 2

**Operators:**

1. + addition

1. - subtraction
2. \* multiplication
3. ^ power
4. ' transpose
5. \ left division
6. / right division

Remember that the multiplication, power and division operators can be used in conjunction with a period to specify an element-wise operation.

PRE TEST:

Q1. **The law which does not hold in multiplication of matrices is known as**

1. distributive law
2. Inverse law
3. associative law
4. **commutative law**

Q2. Two Matrices A and B are multiplied to get AB if

1. Both are Rectangular
2. Number of Rows of first Matric = Number of Rows of Second Matrix
3. **Number of columns of first Matric = Number of Rows of Second Matrix**
4. None of the above

. Q3. The notation **.\* does**

1. Matrix Multiplication
2. **Matrix Element multiplication**
3. Only Row multiplication
4. None of the above

Q4. If matrix A = [1 2 3] then find AA’, where A’ is the transpose of matrix A.

* 1. 12
  2. 10
  3. 6
  4. **14**

Q5.If A and B are symmetric matrices of the same order, then  
(a) AB is a symmetric matrix  
(b) A – Bis askew-symmetric matrix  
(c) AB + BA is a symmetric matrix  
(d) AB – BA is a symmetric matrix

POST TEST:

### ****Q.1What does Matlab stand for?****

a) Math Laboratory

**b) Matrix Laboratory**

c) Mathworks

d) Nothing

### ****Q2.What symbol precedes all comments in Matlab?****

a) “

**b) %**

c) //

d) <

**Q3.Index of an array in MATLAB start with**

a) 0

**b) 1**

c) 2

d) 3

Q4. eye([n](https://www.mathworks.com/help/matlab/ref/eye.html" \l "btpi59x-1-n),[m](https://www.mathworks.com/help/matlab/ref/eye.html#btpi59x-1-m)) returns an n-by-m matrix with ones on the main diagonal and zeros elsewhere.

* + 1. **True**
    2. False

Q5.If x=[1+j; 0; 0;1 ], y=transpose(x) gives

a) **y= 1.0000 + 1.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 1.0000 + 0.0000i**

b) y= 1.0000 - 1.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 1.0000 + 0.0000i

c) y= 1.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 1.0000 + 0.0000i

d) y=0

REFERENCES:

1. MasterinMATLAB-7 Duane Hanselman, Bruce Littlefiele, Person Education
2. MATLAB programming manual by Mathworks Inc
3. MATLAB & Simulink Introduction to applications – Partha S. Mallick, Scitech publications

C.B. Moler, Numerical Computing with MATLAB, SIAM, 2004. Available online at <http://www.mathworks.com/moler/index_ncm.html>