**MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY**

SANTOSH, TANGAIL-1902



DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

**Course Title: Computer Based Numerical Method Lab**

**Course Code: ICT-2102**

**Lab Report on: Matrix Operations in MATLAB**

**Lab Report No: 02**

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| Submitted By | Submitted To |
| Name: Kuldip Saha Mugdha  ID: IT22018  2nd Year, 1st Semester  Session: 2021-2022  Dept. of ICT, MBSTU | Dr. Mst. Nargis Akter  Professor  DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY  MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY |

**Date of Performance:**

**Date of Submission:**

**Experiment No : 01**

**Experiment Name: Matrix Operations in MATLAB**

**Objective:**

The objective of this experiment is to understand basic matrix operations including addition, subtraction, multiplication, identity matrix creation, and matrix transpose using MATLAB.

**Materials:**

* MATLAB software installed on a computer

#### Code, Procedure, and Output:

### 1. ****Matrix Addition and Subtraction:****

**Code:**

% Define two matrices

A = [1 2; 3 4];

B = [5 6; 7 8];

% Addition

C\_add = A + B;

% Subtraction

C\_sub = A - B;

% Display results

disp('Matrix A:');

disp(A);

disp('Matrix B:');

disp(B);

disp('Result of Addition (A + B):');

disp(C\_add);

disp('Result of Subtraction (A - B):');

disp(C\_sub);

**Output:**

Matrix A:

1 2

3 4

Matrix B:

5 6

7 8

Result of Addition (A + B):

6 8

10 12

Result of Subtraction (A - B):

-4 -4

-4 -4

**Matrix Multiplication:**

**Code:**

% Define two matrices

A = [1 2; 3 4];

B = [5 6; 7 8];

% Multiplication

C\_mult = A \* B;

% Display result

disp('Matrix A:');

disp(A);

disp('Matrix B:');

disp(B);

disp('Result of Multiplication (A \* B):');

disp(C\_mult);

**Output:**

Matrix A:

1 2

3 4

Matrix B:

5 6

7 8

Result of Multiplication (A \* B):

19 22

43 50

**Identity Matrix Creation:**

**Code:**

% Create a 3x3 identity matrix

I = eye(3);

% Display identity matrix

disp('3x3 Identity Matrix:');

disp(I);

**Output:**

3x3 Identity Matrix:

1 0 0

0 1 0

0 0 1

**Matrix Transpose:**

**Code:**

% Define a matrix

A = [1 2 3; 4 5 6];

% Transpose

A\_transpose = A';

% Display original and transposed matrices

disp('Original Matrix A:');

disp(A);

disp('Transpose of Matrix A:');

disp(A\_transpose);

**Output:**

Original Matrix A:

1 2 3

4 5 6

Transpose of Matrix A:

1 4

2 5

3 6

#### Discussion:

* **Matrix Addition and Subtraction:** MATLAB allows straightforward addition and subtraction of matrices using the + and - operators respectively. The operations are performed element-wise.
* **Matrix Multiplication:** Matrix multiplication in MATLAB is performed using the \* operator. It follows standard matrix multiplication rules where the number of columns in the first matrix must equal the number of rows in the second matrix.
* **Identity Matrix:** MATLAB provides the eye() function to easily create identity matrices. These matrices are useful in solving linear equations and other matrix-related computations.
* **Matrix Transpose:** The transpose of a matrix is obtained using the ' operator. It swaps the rows and columns of the matrix, which is useful in many applications such as solving systems of linear equations.