INSTITUTE OF INFORMATION TECHNOLOGY

JAHANGIRNAGAR UNIVERSITY

Lab Report : 01

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Course Tittle : Numerical Analysis Lab

Course Code : ICT - 2106

Submitted To

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IIT - JU

Exercise 1. Find the value of y = ln(sinh(exp(54 / 6*))).

Answer:

```
>>a  = 54^3

a  =

     157464

>> b = 6*pi

b  =

   18.8496

>> y = log(sinh(exp(a/b)))

y  =

   Inf
```

Exercise 2: Find the size, and length of following matrices

A=[1 2 3; 4 5 6;7 6 54; 65 23 45]

B=7:1:13.5

Answer:

```
>> A = [1 2 3; 4 5 6; 7 6 54; 65 23 45]

A =

     1     2     3

     4     5     6

     7     6    54

    65    23    45
```

```
>> X = size(A)

X =

    4     3

>> max(size(A))

ans =

    4

>> B = 7:1:13.5

B =

  Columns 1 through 6

    7     8     9    10    11    12

  Column 7

   13

>> X = size(B)

X =

    1     7

>> max(size(B))

ans =

    7

>>
```

Exercise 3. A=[2 3; 4 5]; B=[3 4; 6 7];

Find A+B, A*B, A.*B,A/B,A\B, A.^2,A./B

Answer:

```
>> A = [2 3; 4 5]

A =

    2     3

    4     5

>> B = [3 4; 6 7]

B =

    3     4

    6     7

>> A+B

ans =

    5     7

   10    12

>> A*B

ans =

   24    29

   42    51

>> A.*B

ans =

    6    12

   24    35

>> A/B
```

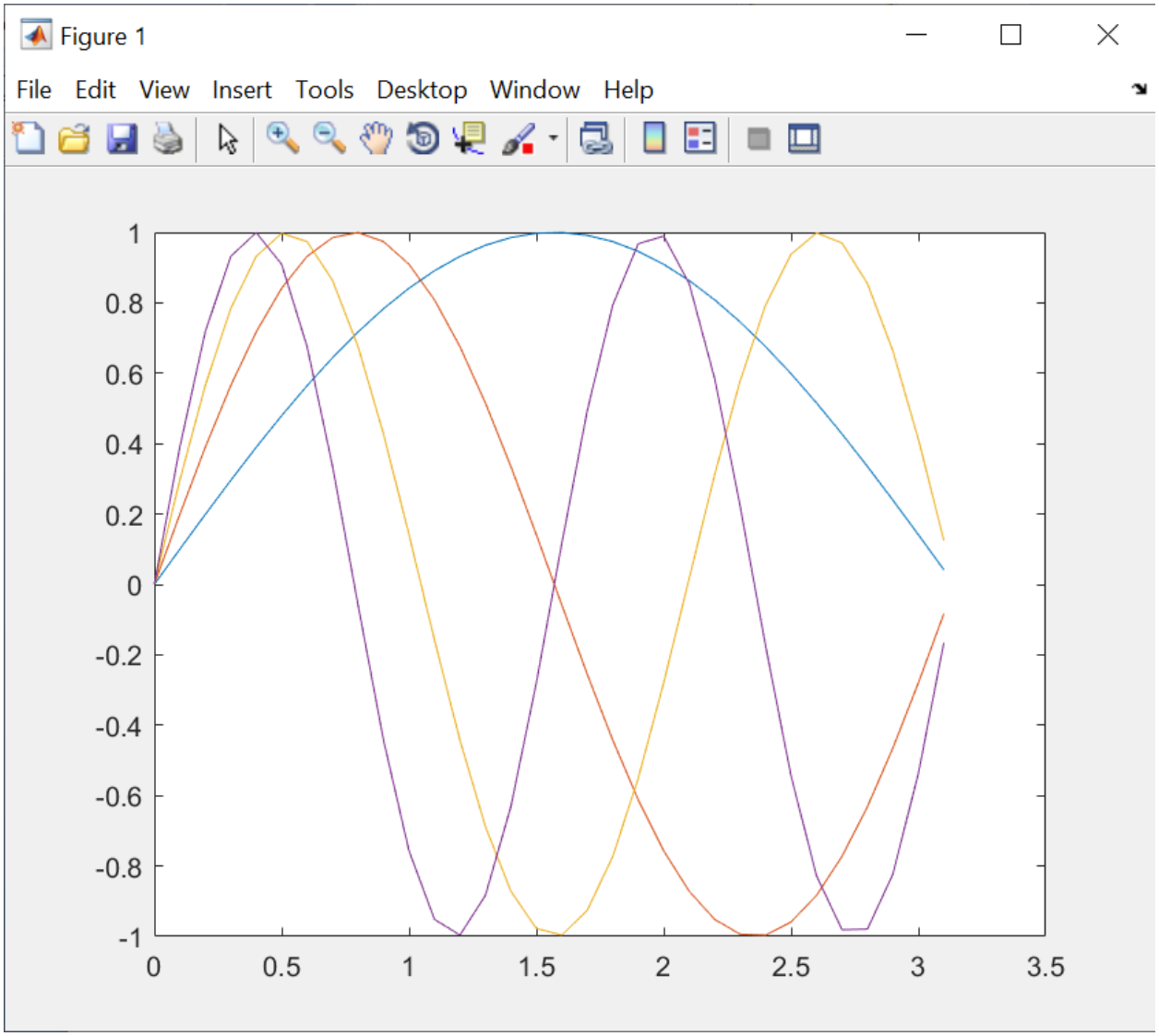
```
ans =

   1.3333   -0.3333

   0.6667    0.3333

>> A\B

ans =

   1.5000    0.5000

        0    1.0000

>> A.^2

ans =

    4     9

   16    25

>> A./B

ans =

   0.6667    0.7500

   0.6667    0.7143
```

Exercise 4. Plot the following functions in the same window y1=sin x, y2=sin 2x, y3=sin 3x, y4=sin 4x where x varies from 0 to pi.

Answer:

```
>> x = 0:0.1:pi;

>> y1 = sin(x);

>> y2 = sin(2*x);
```

```
>> y3 = sin(3*x);

>> y4 = sin(4*x);

>> plot(x,y1,x,y2,x,y3,x,y4)
```



Exercise 6. Define the matrices

A=[17 2 3 4; 5 6 7 8; 9 10 11 12; 13 14 15 16]

B=[2 3 4 5 ; 6 7 8 9 ; 10 11 12 13 ; 14 15 16 17]

C=[1 2 3 ; 4 5 6 ; 7 8 9]

y=[4 3 2 1]'

a) Compute AB and BA. Is matrix multiplication commutative?

b) Compute AC. Why do you get an error message?

c) Solve the following system of equations:

17x1+2x2+3x3+4x4 = 4

5x1+6x2+7x3+8x4 = 3

9x1+10x2+11x3+12x4 = 2

13x1+14x2+15x3+16x4 = 1

Answer:

(a)

```
>> A = [17 2 3 4; 5 6 7 8; 9 10 11 12; 13 14 15 16]

A =

   17    2    3    4

    5    6    7    8

    9   10   11   12

   13   14   15   16

>> B = [2 3 4 5; 6 7 8 9; 10 11 12 13; 14 15 16 17]
```

```
B =

    2    3    4    5

    6    7    8    9

   10   11   12   13

   14   15   16   17

>> A*B

ans =

  132  158  184  210

  228  254  280  306

  356  398  440  482

  484  542  600  658

>> B*A

ans =

  150  132  146  160

  326  260  290  320

  502  388  434  480

  678  516  578  640
```

Yes matrix multiplication is commutative.

(B)

```
>> A=[17 2 3 4; 5 6 7 8; 9 10 11 12;13 14 15 16]

A =
```

```
   17     2     3     4
    5     6     7     8
    9    10    11    12
   13    14    15    16
>> C=[1 2 3; 4 5 6; 7 8 9]
C =1     2     3
    4     5     6
    7     8     9
>> A*C
Error using  *
Inner matrix dimensions must agree.
```

(C)

```
>> A=[17 2 3 4; 5 6 7 8; 9 10 11 12;13 14 15 16]
A =
   17     2     3     4
    5     6     7     8
    9    10    11    12
   13    14    15    16
>> Y = [ 4 3 2 1 ]'
Y =
    4
```

```
     3

     2

     1

>> X=linsolve(A,Y)

Warning: Matrix is close to singular or badly scaled. Results may be inaccurate.

RCOND =  1.940034e-18.

X =

    0.0000

    4.7347

  -14.4693

    9.4847
```