

# ***Experiment 1***

## ***Recollection of MATLAB Basics***

Recollected the basics on Indexing/Slicing/Concatenating of Matrices and Vectors. Also different functions of/on Matrices. Recollected the plotting commands such as plot/plot3/ezplot/surf etc.

### **Question – 1 Goldbach Conjecture**

#### **Code:**

```
%Goldbach Conjecture - 16BCE0783 -> Number input = 783
n = input('Enter the number n: ');
list = [];
c = 0;
while n>1
    if (rem(n,2)==0)
        f = n/2;
    else
        f = (3*n) + 1;
    end
    c = c+1;
    n = f;
    list(c) = f;
end
list
disp(['Number of steps is: ',num2str(c)])
```

**Output:** (Entered n = 783)

```
Editor - D:\VIT\Sem 2\MAT 2002\MATLAB\goldbach_conjuncture.m
goldbach_conjuncture.m  x  +
1  %Goldbach Conjecture - 16BCE0783 -> Number input = 783
2  n = input('Enter the number n: ');
3  list = [];
4  c = 0;
5  while n>1
6      if (rem(n,2)==0)
7          f = n/2;
8      else
9          f = (3*n) + 1;
10     end
11     c = c+1;
12     n = f;
13     list(c) = f;
14 end
15 list
16 disp(['Number of steps is: ',num2str(c)])

Command Window

Columns 109 through 117

    106    53    160    80    40    20    10    5    16

Columns 118 through 121

     8     4     2     1

Number of steps is: 121
fx >>
```

## Question 2: $AB = C$

### Code:

```
%Question 1 - 16BCE0783
l = [];
for i=1:8;l(i) = 0.25*(2^(i-1));end
A = cat(1,1:2:15,2.5:-0.5:-1,1)
C = A(:, [1,4,7])
B = A\C
```

### Output:

```
D:\VIT\Sem 2\MAT 2002\MATLAB\FCS
Command Window

>> exp1q1

A =

    1.0000    3.0000    5.0000    7.0000    9.0000   11.0000   13.0000   15.0000
    2.5000    2.0000    1.5000    1.0000    0.5000         0   -0.5000   -1.0000
    0.2500    0.5000    1.0000    2.0000    4.0000    8.0000   16.0000   32.0000

C =

    1.0000    7.0000   13.0000
    2.5000    1.0000   -0.5000
    0.2500    2.0000   16.0000

B =

    1.0000    0.3445   -0.0766
         0         0         0
         0         0         0
         0         0         0
         0         0         0
    0.0000    0.7943    0.7679
         0         0         0
   -0.0000   -0.1388    0.3086

fx >> |
```

### Question 3: Verifying Cayley Hamilton Theorem

#### Code:

```
%Cayley Hamilton Theorem - 16BCE0783
A = input('Enter the Matrix: ');
k = size(A);
RHS = zeros(k)
if k(1) ~= k(2)
    disp('Not a square matrix!!!')
    return;
end
coeff = poly(A);
LHS = zeros(k);
for i=1: numel(coeff)
    LHS = LHS + round(coeff(i))*A^(k(1)+1-i);
end
LHS
if (LHS == RHS)
    disp('Hence, Cayley-Hamilton theorem is verified for your matrix.')
else
```

```

disp('Caley-Hamilton theorem is not verified for your matrix.')
end

```

## Input & Output:

```

9 -   coeff = poly(A);
...
Command Window

>> explq2
Enter the Matrix: [0 7;8 3]

RHS =

     0     0
     0     0

LHS =

     0     0
     0     0

Hence, Caley-Hamilton theorem is verified for your matrix.
fx >>

```

## Question 4: Newton-Raphson Approximation Method

### Code:

```

%Newton - Raphson Approximation - 16BCE0783
syms x
f = input('Input an algebraic or trancedental function of x: ');
a0 = input('Input the value of initial Approximation for your function: ');
l = [a0];
df = diff(f,x);
for i=2:11
    l(i) = l(i-1) - (subs(f,x,l(i-1))/subs(df,x,l(i-1)));
end
disp('The list of roots from x1 to x10 are:')
disp(l(2:11))
fprintf('The fifth root of the given number is %f\n',l(11))

```

## Input & Output:

```
12 - fprintf('The fifth root of the given number is %f\n',h(11))
```

Command Window

```
>> exp1q3
```

```
Input an algebraic or trascendental function of x: x^5 - 83
```

```
Input the value of initial Approximation for your function: 3
```

```
The list of roots from x1 to x10 are:
```

```
2.6049    2.4445    2.4205    2.4200    2.4200    2.4200    2.4200    2.4200    2.4200    2.4200
```

```
The fifth root of the given number is 2.420001
```

```
f1 >>
```