ASSIGNMENT No. 9

Title : Matlab Solver for all Numerical Methods

1. **Roots of Equation**

```
>> f = inline('x^2 + 10*x -3100')

f =
     Inline function:
     f(x) = x^2 + 10*x -3100

>> root = fzero(f,0)

root =

   50.9017
```

2. **Numerical Integration**

```
>> f = inline('3*(0.4+0.004*T)')

f =

     Inline function:
     f(T) = 3*(0.4+0.004*T)

>> I = quad(f,25,125)

I =

  210
```

3. Simultaneous Equation

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

A =

2	4	3
3	6	1
1	3	2

>> B = [13;16;9]

B =

13
16
9

>> X = linsolve(A,B)

X =

1.0000
2.0000
1.0000

4. Curve Fitting

a) Straight line

>> X = [19 25 30 36 40 45 50]

X =

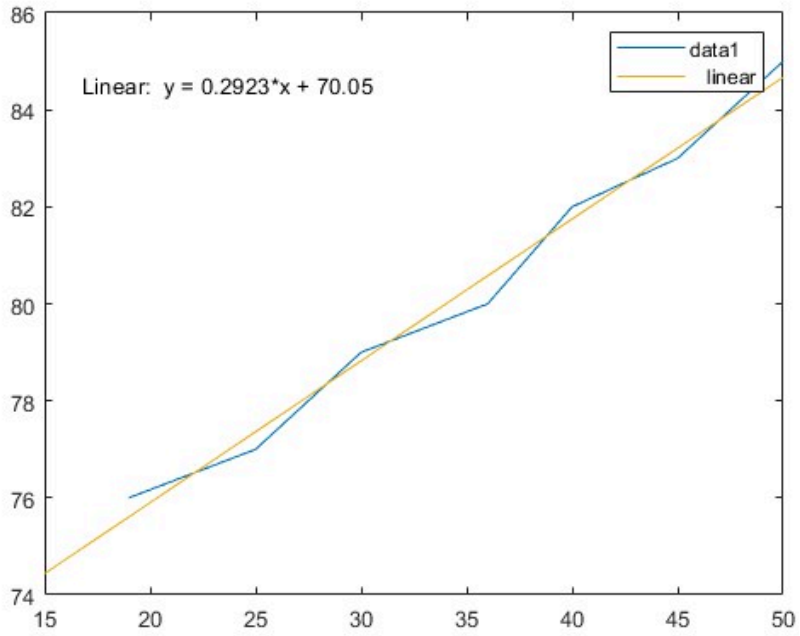
19 25 30 36 40 45 50

>> Y = [76 77 79 80 82 83 85]

Y =

76 77 79 80 82 83 85

>> plot(X,Y)



(Answer : Linear: y = 0.2923*x + 70.05)

5. Interpolation

```
>> X = [-12 10 38]

X =

   -12    10    38

>> Y = [50.1 10 4.9]

Y =

   50.1000   10.0000    4.9000

>> Xg = interp1(Y,X,16,"spline")

Xg =

  -15.6600
```

6. **Ordinary Diff. Equation**

>> f = inline('(x^2)/(y^2 + 1)')

f =

Inline function:
f(x,y) = (x^2)/(y^2 + 1)

>> [Xn Yn] = ode23(f,[0,1],0)

Xn =

0
0.0250
0.0500
0.0731
0.0962
0.1192
0.1423
0.1654
0.1918
0.2225
0.2581
0.2995
0.3474
0.4030
0.4677
0.5431
0.6315
0.7315
0.8315
0.9315
1.0000

Yn =

0
0.0000
0.0000
0.0001
0.0003
0.0006
0.0010
0.0015
0.0024
0.0037
0.0057
0.0090
0.0140
0.0218
0.0341
0.0533
0.0838
0.1298
0.1894
0.2634
0.3222