Scilab Manual for
Numerical and Statistical Methods Laboratory
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Experiment: 1

Program for roots of Equation using Bisection Method accuracy criteria

Scilab code Solution 1.1 Bisection Method

```
1 //Scilab code Solution 1 Program for roots of
    Equation using Bisection Method accuracy criteria
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 1
5 // Program for roots of Equation using Bisection
    Method accuracy criteria
6 // Example - Write a computer program in SCILAB
     to find root of equation as x^2-8x+2..
7 //Take Accuracy as 0.01 using Bisection Method.Take
    x1=0 and x2=1
8 // Input x1=0,x2=1,acc=0.01,f(x)=x^2-8*x+2
9 clc;
10 clear;
11 close;
```

```
12 deff('y=f(x)','y=x^2-8*x+2')
13 x1=input('Enter First Initial Guess = ');
14 x2=input('Enter Second Initial Guess = ');
15 acc=input('Enter the value of Accuracy =');
16 i=0;
17 printf('Iteration \t x1 \t \t x2 \t \t z \t \t f(z)\
   n ' )
18 while abs(x1-x2)>acc // Condition of Accuracy
19       z=(x1+x2)/2
20 printf ('%i\t \t%f \t%f \t%f \t%f \n ',i,x1,x2,z,f(z
   ))// Print in form of Table
21 if f(z)*f(x1)>0  // Substitution of initial guess
   for next iteration
22       x1=z
23 else
24       x2=z
25 end
26       i=i+1 // Increment in Iteration by 1 for each
            step
27 end
28 printf(' \n\n The solution of this equation is %g
   after %i Iterations ',z,i-1)// Display final
   anaswe to User
```

Experiment: 2

Program for roots of Equation using Newton Raphson Method accuracy criteria

Scilab code Solution 2.2 Newton Raphson Method

```
1 //Scilab code Solution 2 Program for roots of
    Equation using Newton Raphson Method accuracy
    criteria
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 2
5 // Program for roots of Equation using Newton
    Raphson Method accuracy criteria
6 // Example - Solve using Newton Raphson Method x-exp
    (-x)=0
7 //Take accuracy as 0.001 .Take x0=1
8 //Input x0=1,acc=0.001,f(x)=x-exp(-x)
9 clc;
10 clear;
11 close;
```

```
12 deff('y=f(x)','y=x-exp(-x)')
13 deff('y=f1(x)','y=1+exp(-x)')
14 x0 =input('Enter Initial Guess = ');
15 acc =input('Enter the value of Accuracy =');
16 i=0;
17 printf('i \t\t x0 \t\t x1 \n')
18 x1=x0-(f(x0)/f1(x0))
19 printf('%i\t\t%0.5f\t\t%0.5f \n' ,i,x0 ,x1 )
20 while abs(x1-x0)>acc // Condition of Accuracy
21 x0=x1;
22 x1=x0-(f(x0)/f1(x0)) // Formula of finding root of
      Equation
23 i=i+1
24 printf ('%i\t \t%f \t%f \n ',i,x0,x1) // Print in
      form of Table
25 end
26 printf('\n\n The root of equation is %0.5f' ,x1) //
      Display final answer to User
```

Experiment: 3

Program for Simultaneous equations using Gauss Elimination Method

Scilab code Solution 3.3 Gaussian Elimination method

```
1 //Scilab code Solution 3 Program for Simultaneous
    equations using Guass Elimination Method
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 3
5 // Program for Simultaneous equations using Guass
    Elimination Method
6 // Example - Write a computer program in SCILAB
      to solve following set of simultaneous
    equations using Gauss Elimination method.
7 //3 X + 2Y + Z = 10
8 //2 X + 3 Y +  2Z = 14
9 //X + 2Y + 3Z = 14
10 // Input coeffienct matrix a and solution matrix b
11 clc;
```

```
clear all;
disp('OUTPUT:');
a=input('Enter coefficient matrix a:=');
b=input('Enter matrix b:=');
[m,n]=size(a);
if m~=n // Check condition of square matrix
   error('Matrix A must be square');
end
//Perform Partial Pivoting
for i=1:1:n-1
    for u=i+1:1:n
         if (abs(a(u,i))>abs(a(i,i))) // Comparison
            of Pivot Element
            for v=1:1:n
               temp=a(i,v); // Replacement of Pivot
                  Element
               a(i,v)=a(u,v);
               a(u,v)=temp;
            end
            temp=b(i);
            b(i)=b(u);
            b(u)=temp;
         end
    end
//Gauss Elimination - operation of Rows
   for k=i+1:1:n
         factor=a(k,i)/a(i,i);
      for j=1:1:n
         a(k,j)=a(k,j)-factor*a(i,j); // Formula to
            make Coefficent Matrix in Upper
            Triangular Matrix
      end
      b(k)=b(k)-factor*b(i); // Formula also
         applicable to solution matrix
   end
end
disp('Final augmented matrix is:');
disp([a,b]); //Display formed Upper Triagular Matrix
```

```
45 // Back Substitution
46 for i=n:-1:1
47    temp=b(i);
48    for j=i+1:1:n
49       temp=temp-a(i,j)*x(j);
50    end
51    x(i)=temp/a(i,i); // Calculating the value of x
         (3),x(2) and x(1) resp.
52 end
53 disp('Answer is:');
54 disp(x);
```

Experiment: 4

Program for Ordinary differential equation using Euler Method

Scilab code Solution 4.4 Euler method

```
1 //Scilab code Solution 4 Program for Ordinary
    differential equation using Euler Method
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 4
5 // Program for Ordinary differential equation using
    Euler Method
6 // Example - Write a computer program in SCILAB to
    solve the ODE
7 //dy/dx=-x*y^2 using Eulers method under the
    condition x=0,y=2.Find y at x=1 with h=0.1.
8 //Input function -xy^2,x0=0,y0=2,xn=1,h=0.1
9 clc;
10 close;
11 clear;
```

```
12 deff('y=f(x,y)','y=-x*y^2');// Enter the Function
13 x0=input('Enter the value of x0=');
14 y0=input('Enter the value of y0=');
15 xn=input('Enter the value of xn=');
16 h=input('Enter the value of h=');
17 n=(xn-x0)/h; // Formuale for finding number of Step
      Size
18 disp(n)
19 for i=1:1:n
20    yn=y0+h*f(x0,y0);// Formulae use in Euler Method
21    x0=x0+h; // Increment in Step size
22    y0=yn; // Replacement of y0 as yn for next
         iteration
23    printf('Value of y(%f)=%f\n',x0,y0);
24 end
```

Experiment: 5

Program for Ordinary differential equation using Runge Kutta 4th order

Scilab code Solution 5.5 RK4ORDER

```
1 //Scilab code Solution 5 Program for Ordinary
    differential equation using Runge-Kutta 4th order
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 5
5 // Program for Ordinary differential equation using
    Runge-Kutta 4th order
6 // Example - Write a computer program in SCILAB to
    obtain the numerical solution of
7 //dy/dx=x^2+y^2, y(0)=0,h=0.2.Estimate  y(0.4) using
     Runge Kutta 4 order method
8 //Input function x^2+y^2,x0=0,y0=0,h=0.2,xn=0.4
9 clc;
10 close;
11 clear;
```

```
12 deff('y=f(x,y,z)','y=x*x+y*y');// Enter the Function
13 x0=input('Enter the value of x0=');
14 y0=input('Enter the value of y0=');
15 xn=input('Enter the value of xn=');
16 h=input('Enter the value of h=');
17 n=(xn-x0)/h;// Formuale for finding number of Step
      Size
18 disp(n)
19 for i=1:1:n
20    k1=h*f(x0,y0);// Calculate value of k1
21    k2=h*f(x0+h/2,y0+k1/2);// Calculate value of k2
22    k3=h*f(x0+h/2,y0+k2/2);// Calculate value of k3
23    k4=h*f(x0+h,y0+k3);// Calculate value of k4
24    k=(k1+2*k2+2*k3+k4)/6.0;// Calculate value of k
25    yn=y0+k;// Increment in Step size
26    x0=x0+h;// Increment in Step size
27    y0=yn;// Replacement of z0 as z1 for next
         iteration
28    printf('Value of y(%f)=%f\n',x0,y0);// Display y(
         n)
29 end
```

Experiment: 6

Program for Ordinary differential equation using Simultaneous equations using Runge Kutta 2nd order method

Scilab code Solution 6.6 RK2Order Simultaneous

```
1 //Scilab code Solution 6 Program for Ordinary
    differential equation using Simultaneous
    equations using Runge-Kutta 2nd order method
2 // Operating System Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 6
5 // Program for Ordinary differential equation using
    Simultaneous equations using Runge-Kutta 2nd
    order method
6 // Example - Write a computer program in SCILAB to
    to solve the equation
7 //dy/dx=-0.5*y,dz/dx=4-0.3*z-0.1*y Using runge kutta
     second order simultaneous method where at x = 0,
     y =4, z =6.
8 //Find y & z at x = 0.5 (take h=0.5)
```

```
9  //Input function f(x,y,z)=-0.5*y, g(x,y,z)= 4-0.3*z
       -0.1*y,x0=0,y0=4,z0=6,h=2,xn=0.5
10 clc;
11 clear;
12 deff('y=f(x,y,z)','y=-0.5*y');// Enter the Function
13 deff('z=g(x,y,z)','z=4-0.3*z-0.1*y');// Enter the
       Function
14 x0=input('Enter the value of x0=');
15 y0=input('Enter the value of y0=');
16 z0=input('Enter the value of z0=');
17 xn=input('Enter the value of xn=');
18 h=input('Enter the value of h=');
19 n=(xn-x0)/h;// Formuale for finding number of Step
       Size
20 for i=1:1:n
21     k1=h*f(x0,y0,z0);// Calculate value of k1
22     L1=h*g(x0,y0,z0);// Calculate value of L1
23     k2=h*f(x0+h,y0+k1,z0+L1);// Calculate value of k2
24     L2=h*g(x0+h,y0+k1,z0+L1);// Calculate value of L2
25     k=(k1+k2)/2.0; // Finding out increment in y
           direction
26     y1=y0+k;// Increment in Step size
27     L=(L1+L2)/2.0;// Finding out increment in z
           direction
28     z1=z0+L;// Increment in Step size
29     x0=x0+h;// Increment in Step size
30     y0=y1;// Replacement of y0 as y1 for next
           iteration
31     z0=z1;// Replacement of z0 as z1 for next
           iteration
32    printf('value of y(%f)=%f\n',x0,y0);// Display y(n
          )
33    printf('value of z(%f)=%f\n',x0,z0);// Display z(n
          )
34 end
```

Experiment: 7

Program for Partial differential equation using Simple Laplace method

Scilab code Solution 7.7 Laplace Method

```
1 //Scilab code Solution 7    Program for Partial
    differential equation using Simple Laplace method
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 7
5 // Program for Partial differential equation using
    Simple Laplace method
6 // Example - A steel Plate of 750x750mm has its two
    adjancent sides maintained at
7 //100 C .While the two other sides are maintained at
     0 C .What will be the
8 //steady state temperature at interior assuming a
    grid size of 250mm.Solve upto 11 iteration
```

```
9  //Input function n1=11,n=4,m=4,u(1,1)=0,u(2,1)=0,u
       (3,1)=0,u(4,1)=0
10 //u(4,2)=0,u(4,3)=0,u(4,4)=0,u(3,4)=100,u(2,4)=100,u
       (1,4)=100
11 //u(1,3)=100,u(1,2)=100
12 clc;
13 clear;
14 n1=input('Enter the no. of iteration to solve
       simultaneous eqn:');
15 n=input(' Enter the no.of mesh point(No.of B.V.
       values) in x-direction:');
16 m=input(' Enter the no.of mesh point(No.of B.V.
       values) in y-direction:');
17 printf(' Enter boundary value(B.V.) in anticlockwise
        direction Starting from bottom left corner\n');
18 u=zeros(m,n); //to create matrix of total size and
       to take initial guess as 0,0,0...
19 for i=1:n// to take input as a boundary value at
       bottom side
20     printf('Enter u(%d,1)=',i);
21     u(i,1)=input('');
22 end
23 for j=2:m //to take I/P at Right hand side B.V.
       bottom to top
24     printf('Enter u(%d,%d)=',n,j);
25     u(n,j)=input('');
26 end
27 for i=n-1:-1:1 // to take I/P at top side B.V. right
        to left
28     printf('Enter u(%d,%d)=',i,m);
29     u(i,m)=input('');
30 end
31 for j=m-1:-1:2 //to take I/P at left hand side B.V.
       top to bottom
32     printf('Enter u(1,%d)=',j);
33     u(1,j)=input(' ');
34 end
35 for k=1:n1 // To repeat n1 iterations
```

```
36      for j=2:m-1 //To calculate value at intermediate
           point by Gauss Seidal method
37          for i=2:n-1
38              u(i,j)=1/4*(u(i-1,j)+u(i,j+1)+u(i+1,j)+u(i,
                   j-1));// Formula for finding Internal
                   Elements
39          end
40      end
41      printf('Value after iteration no.:%d\n',k);
42      for j=m:-1:1 //To print value after each
           Iteration in Tabulated form
43          for i=1:n
44              printf('\t %0.4f \t',u(i,j));
45          end
46         printf('\n');
47     end
48 end
```

Experiment: 8

Program for Numerical Integration using Trapezoidal rule

Scilab code Solution 8.8 TrapezoidalRule

```
1 //Scilab code Solution> 8 Program for Numerical
    Integration using Trapezoidal rule
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 8
5 // Program for Numerical Integration using
    Trapezoidal rule
6 // Example - Write a computer program in SCILAB to
    solve integration 4*x+2
7 //limits x0=0,xn=1 by using Trapezoidal Method.
8 //Take h=0.5.
9 //Program on Trapezoidal Rule
10 clc;
11 close;
12 clear;
```

```
13 deff('y=f(x)','y=4*x+2');// Enter the Function
14 x0=input('Enter lower limit:');// Enter Lower Limit
15 xn=input('Enter upper limit:');// Enter Upper Limit
16 h=input('Enter step Size h:');// Enter Step Size
17 x=x0;
18 n=(xn-x0)/h;// Enter number of Step size
19 s=0;
20 for i=1:n-1
21    x=x+h;
22    s=s+2*f(x);
23 end
24 s=f(x0)+s+f(xn);
25 I=h/2*s;// Formula for finding Area by using
      Trapezoidal Rule
26 printf('Integration of given function is=%f\n',I);
```

Experiment: 9

Program for Numerical Integration using Simpsons 1/3rd Rule

Scilab code Solution 9.9 Simpson 1 3rd Rule

```
1 //Scilab code Solution 9    Program for Numerical
    Integration using Simpsons 1/3 rd Rule
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 9
5 // Program for Numerical Integration using
    Simpsons 1/3 rd Rule
6 // Example - Write a Program in Scilab for finding
    area of fucntion (sin(x))/(2+3*sin(x)) for
7 //upper limit of 1 and lower limit of 0.Take n=6 by
    using Simpson's 1/3 Rule
8 //Program on Simpson's 1/3rd Rule
9 clc;
10 clear;
11 deff('y=f(x)','y=(sin(x))/(2+3*sin(x))');// Enter
```

```
    the Function
12 x0=input('Enter lower limit:');// Enter the lower
    limit of x
13 xn=input('Enter upper limit:');// Enter the upper
    limit of x
14 n=input('Enter number of steps:');// Enter the
    number of steps
15 x=x0;
16 h=(xn-x0)/n;// Calculate step size
17 s=0;
18 for i=1:n-1
19    x=x+h;
20    if modulo(i,2)==0 // Calculating Even Term of
       Simpson 1/3rd Formula
21       s=s+2*f(x);
22    else
23       s=s+4*f(x);
24    end
25    end
26 s=f(x0)+s+f(xn);
27 I=(h/3)*s;// Finding Integrating value
28 printf('\nIntegration of given function is=%f\n',I);
    // Display Value
```

Experiment: 10

Program for Numerical Integration using Simpsons 3/8th Rule.

Scilab code Solution 10.10 Simpson 3 8th Rule

```
1 //Scilab code Solution 10  Program for Numerical
    Integration using Simpsons 3/8 Rule
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 10
5 // Program for Numerical Integration using
    Simpsons 3/8 Rule
6 // Example - Write a Program in Scilab for finding
    area of fucntion exp(x)/x for
7 //upper limit of 2 and lower limit of 1.Take n=6 by
    using Simpson's 3/8 Rule
8 //Program on Simpson's 3/8th Rule
9 clc;
10 close;
11 clear;
```

```
12 deff('y=f(x)','y=exp(x)/x');// Enter function
13 x0=input('Enter lower limit:');// Enter lower limit
      of x
14 xn=input('Enter upper limit:');// Enter upper limit
      of x
15 n=input('Enter number of steps:');// Enter number of
       step
16 x=x0;
17 h=(xn-x0)/n;// Finding out of step size
18 s=0;
19 for i=1:n-1
20    x=x+h;
21    if modulo(i,3)==0 // Condition for adding the odd
         value together
22      s=s+2*f(x);
23    else
24      s=s+3*f(x);
25    end
26    end
27 s=f(x0)+f(xn)+s;
28 I=((3*h)/8)*s; // Calculating Area
29 printf('\nIntegration of given function is=%f\n',I);
```

Experiment: 11

Program for Numerical Integration using Gauss Quadrature 2-point and 3-point method

Scilab code Solution 11.11 Gauss 2 and 3 Point Method

```
1 //Scilab code Solution 11  Program for Numerical
    Integration using Gauss Quadrature 2-point and 3-
    point method
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 11
5 // Program for Numerical Integration using Gauss
    Quadrature 2-point and 3-point method
6 // Example - Write a Program in Scilab to solve
    using two-point or three point Gauss quadrature
    rule to
7 //approximate the distance covered by a rocket from
    t = 8 to t = 30 as given by
8 //x=(2000*log(140000/(140000-2100*t))-9.8*t)
9 // Enter a=lower limit=8,b=upper limit=30,n=Enter 2
```

```
    or 3 depend upon Guass 2 point or 3 point formula
10 //Program on Gauss Quadrature 2-point and 3-point
    method
11 clc;
12 clear;
13 deff('x=f(t)','x=(2000*log(140000/(140000-2100*t))
    -9.8*t)');// Enter the function
14 a=input('Enter lower limit:');// Enter the lower
    limit of Integration
15 b=input('Enter upper limit:');// Enter the upper
    limit of Integration
16 n=input('Enter 2 point or 3 point method:');// Enter
     which method you are suppose to use
17 if n==2  // For executing 2 Point Method
18     c=(b-a)/2;
19     d=(b+a)/2;
20     z1=-1/sqrt(3);
21     z2=1/sqrt(3);
22     x1=c*z1+d;
23     x2=c*z2+d;
24     I=c*(f(x1)+f(x2));// Formula for finding
        Integration value
25 else // For executing 3 Point Method
26     c=(b-a)/2;
27     d=(b+a)/2;
28     z1=sqrt(3/5);
29     z2=-sqrt(3/5);
30     x1=c*z1+d;
31     x2=c*z2+d;
32     x3=d;
33     I=c*(5/9*f(x1)+5/9*f(x2)+8/9*f(x3));// Formula
        for finding Integration value
34 end
35 printf('\n Integration of given function is=%f\n',I)
    ;// Display the Integration
```

Experiment: 12

Program for Numerical Double Integration using Trapezoidal rule

Scilab code Solution 12.12 Trapezoidal Double Rule

```
1 //Scilab code Solution  12 Program for Numerical
    Double Integration using Trapezoidal rule
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 12
5 //  Program for Numerical Double Integration using
    Trapezoidal rule
6 // Example - Write a Program in Scilab for finding
    area of fucntion x+y for
7 //upper limit of 0 and lower limit of 1 for x,y.Take
     n=m=6 by using Numerical Double Integration
    using Trapezoidal rule
8 //Take f(x,y)=x+y,x0=0,xn=1,y0=0,yn=1,n=m=6
9 //  Program for Numerical Double Integration using
    Trapezoidal rule
```

```
clc;
close;
clear;
deff('y=f(x,y)','y=x+y');// Enter function
x0=input('Enter x0 lower limit of x:');// Enter
   lower limit of x
xn=input('Enter xn upper limit of x:');// Enter
   upper limit of x
n=input('Enter no. of steps in x-direction:');//
   Enter number of step size in x axis
y0=input('Enter y0 lower limit of y:');// Enter
   lower limit of y
ym=input('Enter ym upper limit of y:');// Enter
   upper limit of y
m=input('Enter no. of steps in y-direction:');//
   Enter number of step size in y axis
h=(xn-x0)/n;// Enter step size in x axis
k=(ym-y0)/m;// Enter step size in y axis
s=0;
x=x0;// Replacement of x by x0
y=y0;// Replacement of y by y0
for i=1:1:m+1
    for j=1:1:n+1
       a(i,j)=f(x,y);// Alloting pivot point by
          putting value in function
       x=x+h;//Increament in x axis
    end
     y=y+k;//Increament in y axis
     x=x0;
 end
 disp([a]);
 for i=1:1:m
    for j=1:1:n
       s=s+a(i,j)+a(i,j+1)+a(i+1,j)+a(i+1,j+1);
    end
 end
 I=h*k/4*s;// Calculating the Area
 printf('Integration of given function is=%f\n',I);
```

```
    // Display the Area
```

Experiment: 13

Program for Curve fitting using least square technique for first order equation

Scilab code Solution 13.13 First Order Equation

```
1 //Scilab code Solution 13   Program for Curve
    fitting using least square technique for first
    order equation
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 13
5 // Program for Curve fitting using least square
    technique for first order equation
6 // Example - Write a computer program in SCILAB to
    fit a straight line to the data given below :
7 // x=[1 2 3 4 5 6 7];
8 //y=[0.5 2.5 2.0 4.0 3.5 6.0 5.5];
9
10 clc;
11 close;
```

```
clear;
//x=input('enter value of x matrix')
x=[1 2 3 4 5 6 7];// Enter the x values (Dependent Variables)
disp([x]);
//y=input('enter value of y matrix')
y=[0.5 2.5 2.0 4.0 3.5 6.0 5.5];// Enter the y values(Independent Variables)
disp([y]);
n=length(x);// Enter the data in x values
Y=y;
X=x;
X2=X.*X;// Calculating X*X Values( .* indicates that multiplication between respective value of x)
XY=X.*Y;// Calculating X*y Values( .* indicates that multiplication between respective value of x and y)
a0=(sum(Y)*sum(X2)-sum(X)*sum(XY))/(n*sum(X2)-(sum(X)^2)); // Calculating coefficient a0
a1=((n*sum(XY)-sum(X)*sum(Y))/(n*sum(X2)-(sum(X))^2));// Calculating coefficient a1
a=a1;//Replacement value of a
b=a0;//Replacement value of b
printf('\n y=%f*x+%f',a,b);// Display y=ax+b
```

Experiment: 14

Program for Curve fitting using least square technique for power equation

Scilab code Solution 14.14 Power Equation

```
1 //Scilab code Solution 14   Program for Curve
    fitting using least square technique for power
    equation
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 14
5 // 14   Program for Curve fitting using least square
     technique for power equation
6 // Example - Write a computer program in SCILAB to
    fit a power equation y=axˆb to the data given
    below :
7 // x=[1 2 3 4 5];
8 //y=[0.5 1.7 3.4 5.7 8.4];
9 //  Program for Curve fitting using least square
    technique for power equation
```

```
clc;
close;
clear;
//x=input('enter value of x matrix')
x=[1 2 3 4 5];// Enter X values( Dependent Variables )
disp([x]);
//y=input('enter value of y matrix')
y=[0.5 1.7 3.4 5.7 8.4];// Enter Y Values( Independent variables)
disp([y]);
n=length(x);// calculate length of x
Y=log(y);// Calculate valur of Y
X=log(x);// Calculate valur of X
X2=X.*X;// Calculate valur of X*X
XY=X.*Y// Calculate valur of X*Y
a0=(sum(Y)*sum(X2)-sum(X)*sum(XY))/(n*sum(X2)-(sum(X)^2));// Calculating coefficienct a0
a1=((n*sum(XY)-sum(X)*sum(Y))/(n*sum(X2)-(sum(X))^2));// Calculating coefficient a1
a=exp(a0); // Replacement of value
b=a1;//Replacement of value
printf('\n y=%f*x^%f',a,b);//Display y= ax^b
```

Experiment: 15

Program for Curve fitting using least square technique for exponential equation

Scilab code Solution 15.15 Exponential Equation

```
1 //Scilab code Solution 15   Program for Curve
    fitting using least square technique for
    exponential equation
2 // Operating System  Windows 7
3 // SCILAB version 6.1.1
4 // Experiment No 15
5 // 15   Program for Curve fitting using least square
     technique for exponential equation
6 // Example - Write a computer program in SCILAB to
    fit a exponential equation y=aeˆbx to the data
    given below :
7 // x=[1 3 5 7 9];
8 //y=[2.473 6.722 18.274 49.673 135.026];
9 //  Program for Curve fitting using least square
    technique for exponential equation
10 clc;
11 close;
```

```
12 clear;
13 //x=input('enter value of x matrix')
14 x=[1.0 3.0 5.0 7.0 9.0];// Enter x values(Dependent
      Variables)
15 disp([x]);
16 //y=input('enter value of y matrix')
17 y=[2.473 6.722 18.274 49.673 135.026];// Enter y
      values(Indepent Variables)
18 disp([y]);
19 n=length(x);// Calculate number of data enter in x
20 Y=log(y);// Calculating Y Value
21 X=x;
22 X2=X.*X;// Calculating X*X Value( .* indicates
      respective value of x is multipled with
      respective x value)
23 XY=X.*Y//// Calculating X*Y Value
24 a0=(sum(Y)*sum(X2)-sum(X)*sum(XY))/(n*sum(X2)-(sum(X
      )^2));// Calculating coefficient a0
25 a1=((n*sum(XY)-sum(X)*sum(Y))/(n*sum(X2)-(sum(X))^2)
      );// Calculating coefficient a1
26 a=exp(a0);// Finding the value of a
27 b=a1;// Finding the value of a
28 printf('\n y=%f*e^%f*x',a,b);//Displaying y=ae^b
```