Scilab Manual for
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Experiment: 1

Solve quadratic equations containing complex numbers and matrix multiplication

Scilab code Solution 1.0 Experiment number 1

```
1  //AIM: Solve quadratic equations containing complex
       numbers & matrix
2  // multiplications
3  //Software version Scilab 5.5.2
4  //OS Windows 7
5
6  clc;
7  clear;
8
9  //consider quadratic equation a(x^2)+(b*x)+c=0 to be
       solved.
10 x=poly(0,"x")
11 a=input('Enter the coefficients of quadratic
       equation(Eg: To solve a(x^2)+(b*x)+c=0, enter [a
       b c])');
12 X=[x^2 x 1]
13 h=a*X'
```

```
14  //h=a*(x^2)+(b*x)+c
15  disp(h)
16  root1=((-a(2))+sqrt((a(2)^2)-4*a(1)*a(3)))/(2*a(1))
17  disp(root1,"1st root of the equation is =")
18  root2=((-a(2))-sqrt((a(2)^2)-4*a(1)*a(3)))/(2*a(1))
19  disp(root2,"2nd root of the equation is")
20
21  //Solving Linear equations in two variables
22  //let two equations be
23  //1: a1.x+b1.y=c1
24  //2: a2.x-b2.y=c2
25  C=input('Enter the coefficients of first linear
        equation in two variables(a1*x+b1*y=c1 may be
        entered as [a1 b1 -c1]:')
26  D=input('Enter the coefficients of second linear
        equation in two variables(a2*x+b2*y=c2 may be
        entered as [a2 b2 -c2]:')
27  a=[C(1:2);D(1:2)];
28  d=[C(3);D(3)];
29  X=linsolve(a,d);
30  mprintf("X=%f\n",X);
```

Experiment: 2

Generate and plot various signals like sine square, pulse in same window.

Scilab code Solution 2.0 Experiment number 2

```
1 //Aim: Generate and plot various signals like sine,
      square, pulse in same window.
2 //Software version Scilab 5.5.2
3 //OS Windows 7
4
5 clc;
6 clear;
7
8 t=-10:0.05:10;
9 a=1;
10 b=t;
11 //To plot the sine wave
12 x1=sin(t);
13 subplot(3,1,1)
14 plot(t,x1)
15 xlabel('time')
16 ylabel('x1[t]')
```

```
17  title('sine  wave')
18
19  //To  plot  the  square  wave
20  x2=squarewave(t);
21  subplot(3,1,2)
22  plot(t,x2)
23  xlabel('time')
24  ylabel('x2[t]')
25  title('square  wave')
26
27  //To  plot  the  impulse  function
28  x3=a*(t==0)
29  subplot(3,1,3)
30  plot(t,x3)
31  xlabel('time')
32  ylabel('x3[t]')
33  title('impulse  function')
```

Experiment: 3

Obtain different types of plots (2D/3D, surface plot, polar plot)

Scilab code Solution 3.0 Experiment number 3

```
1  //Aim: Obtain different types of plots (2D, surface
       plot, polar plot).
2  //Software version Scilab 5.5.2
3  //OS Windows 7
4
5  clear;
6  clc;
7  //plot for 2D
8  figure()
9  x =-10: 0.1 : 10;// Define your x-values
10 y =cos(x).*sinc(x);// Define your function
11 plot(x, y)
12 title('2D plot')
13 xlabel('x axis');
14 ylabel('y axis');
15 legend('y =cos(x).*sinc(x)');
16
```

```scilab
17  //plot for polar plot
18  figure()
19  t = linspace(0, 2*%pi, 100);
20  r =sqrt(abs(2 * sinc(5*t)));
21  title('polar plot')
22  polarplot(t, r);
23
24  //plot for surface plot
25  figure()
26  t=[0:0.3:2*%pi]';
27  z=sin(t)*cos(t');
28  xlabel('x axis');
29  ylabel('y axis');
30  zlabel('z axis');
31  title('surface plot');
32  plot3d(t,t,z)
```

Experiment: 4

Plot the diode/transistor characteristics.

Scilab code Solution 4.0 Experiment number 4

```
1  //AIM: Plot the diode/transistor characteristics
2  //Software version Scilab 5.5.2
3  //OS Windows 7
4
5  clear;
6  clc;
7
8  Vd=0:0.1:1//diode voltage
9  Is=10^(-15)//assume reverse biased saturation
       current
10 n=1//Emission coefficient
11 Temp=32//temperature in degrees
12 T=Temp+273//temperature in Kelvin
13 k=1.38*10^(-23)//Boltzmann's Constant
14 q=1.6*10^(-19)//Charge of electron
15 Vt=(k*T)/q//thermal voltage
16 Id=Is*(exp(Vd/(n*Vt))-1)//Diode current
17 subplot(1,2,1)
18 plot(Vd,Id)
```

```
19  xlabel("Vd in volts")
20  ylabel("Id in mA")
21  title("Characteristic of diode when forward biased")
```

Experiment: 5

Solve node, mesh and loop equations of simple electrical/network circuits.

Scilab code Solution 5.0 Experiment Number 5

```
1  //Aim: Solve node,mesh and loop equations of simple
        electrical/network circuits.
2  //Software version :Scilab 5.5.2
3  //OS: Windows 7
4  //Toolbox: SIVP_0.5.3.2
5
6  clc;
7  clear;
8
9  //**PLEASE REFER THE DEPENDENCY FILE i.e. the
        circuit **
10
11 //Mesh/loop analysis
12
13 V=10//in volts
14 R1=1000//in ohms
15 R3=1000//in ohms
```

```
16  R4=2000//in ohms
17  R2=2000//in ohms
18  R22=(R2*R4)/(R2+R4)
19  disp("Ohms",R22,"R22=")
20  //10==(I*R1)+(I*R2)+(I*R3)
21  I=V/(R1+R22+R3)
22  disp("Ampere",I,"I=")
23  I1=I*(R2/(R4+R2))
24  disp("Ampere",I1,"I1=")
25
26  //Nodal analysis
27  //((Va-10)/(1000+1000))+(Va/2000)+(Va/2000)==0
28  Va=(V/(R1+R3))/((1/R2)+(1/R4)+(1/(R1+R3)))
29  disp("Volts",Va,"Va=")
```

check Appendix AP 2 for dependency:

CiruitForExp5.jpg

Experiment: 6

Find the poles and zeros hence plot the transfer functions/polynomials

Scilab code Solution 6.0 Experiment number 6

```
1  //AIM: Find  the  poles  and  zeros  hence  plot  the
        transfer  functions/polynomials
2  //Software  version  Scilab  5.5.2
3  //OS Windows 7
4
5  clear;
6  clc;
7
8  //Consider  the  transfer  function
9  //T.F=(s*(s+2))/(s^2+2*s+2)
10
11 x=poly(0,"x")
12 a1=input("Enter  the  value  of  coefficient  of  a=");
13 b1=input("Enter  the  value  of  coefficient  of  b=");
14 c1=input("Enter  the  value  of  coefficient  of  z=");
15 zero1=((-b1)+sqrt((b1^2)-4*a1*c1))/(2*a1)
16 printf("1st  zero  =  %g\n",zero1)
```

```
17  zero2 =((-b1)-sqrt((b1^2)-4*a1*c1))/(2*a1)
18  printf("2nd  zero  =  %g\n\n",zero2)
19
20  y=poly(0,"y")
21  a2=input("Enter  the  value  of  coefficient  of  a=");
22  b2=input("Enter  the  value  of  coefficient  of  b=");
23  c2=input("Enter  the  value  of  coefficient  of  z=");
24
25  root1 =((-b2)+sqrt((b2^2)-4*a2*c2))/(2*a2)
26  disp(root1 ,"1st  pole  =")
27  root2 =((-b2)-sqrt((b2^2)-4*a2*c2))/(2*a2)
28  disp(root2 ,"2nd  pole  =")
29  disp('Transfer  function  =  (s*(s+2))/(s^2+2*s+2)')
```

Experiment: 7

Read floating point numbers from a formatted file and sort it in ascending order and save in another text file

Scilab code Solution 7.0 Experiment Number 7

```
1 //Aim:Read floating point numbers from a formated
      file and sort it in asending
2 //     order and save in another text file
3 //Software version Scilab 5.5.2
4 //OS Windows 7
5
6 clear;
7 clc;
8 fid=mopen("C:\Program Files\scilab-5.5.2\contrib\
      text.txt","r")//reading the file
9 if(fid==-1)
10     error("cannot open file\n")
11 else
12     printf("Scilab can read selected file\n")
13 end
```

```
14  num_yet=0
15  done_yet=0
16  while(done_yet==0)
17      [num_read,val(1),val(2),val(3),val(4)]=mfscanf(
            fid,"%f%f%f%f")
18      if(num_yet<=0)
19          done_yet=1;
20  end
21  end
22  file("close",fid)
23  printf("The floating point numbers from a formated
        file\n")
24  disp(val)
25  l=length(val)
26
27  printf("Values in ascending order copied in another
        text file with name new in same directory\n")
28  for i=1:(l-1)
29      for j=1:(l-1)
30          if(val(j)>val(j+1))
31              temp=val(j)
32              val(j)=val(j+1)
33              val(j+1)=temp
34          end
35      end
36  end
37  disp(val)
38  fis=mopen("new.txt","w")                        //
        creating the new file
39  mfprintf(fis,"%f\n%f\n%f\n%f",val(1),val(2),val(3),
        val(4))
40  file("close",fis)
```

check Appendix AP 1 for dependency:

```
text.txt
```

Experiment: 8

Plot a full wave rectified waveform using Fourier series.

Scilab code Solution 8.0 Experiment Number 8

```scilab
1  //Aim:Plot a full wave rectified waveform using
        Fourier series
2  //Software version Scilab 5.5.2
3  //OS Windows 7
4
5  clc;
6  clear;
7  funcprot(0);                         //creating funtion
        for Fourier series
8  function y=f(x),y=1/%pi*sin(x),endfunction
                    //calculating a0
9      a0=intg(0,%pi,f)            //integrating from 0 to
            %pi for calculating a0
10 function [a0,A]=fourier(l,n,f)
11     for i=1:n
12         function b=f1(x,f)
13             b=f(x)*cos(i*%pi*x/l)*sin(i*%pi*x/l);
                    //declaring function An
14         endfunction
```

19

```
15          A(i)=1/l*intg(0,%pi,f1);              //
               calculating value of An
16      end
17      function series=solution(x)
18          series=a0/2
19          for i=1:n
20              series=series+A(i)*cos(i*%pi*x/l);   //
                   suming the serice
21          end
22      endfunction
23      x=0:0.1:6*l;
24      plot2d(x,10*(solution(x)-0.068));
25      title("output voltage of full wave rectifier")
26      ylabel("amplitude")
27      xlabel("time")
28 endfunction
29 deff('a=f(x)','a=x')
30 [a0,A]=fourier(%pi,1,f)              //calling function by
       asinging value of l and n
```
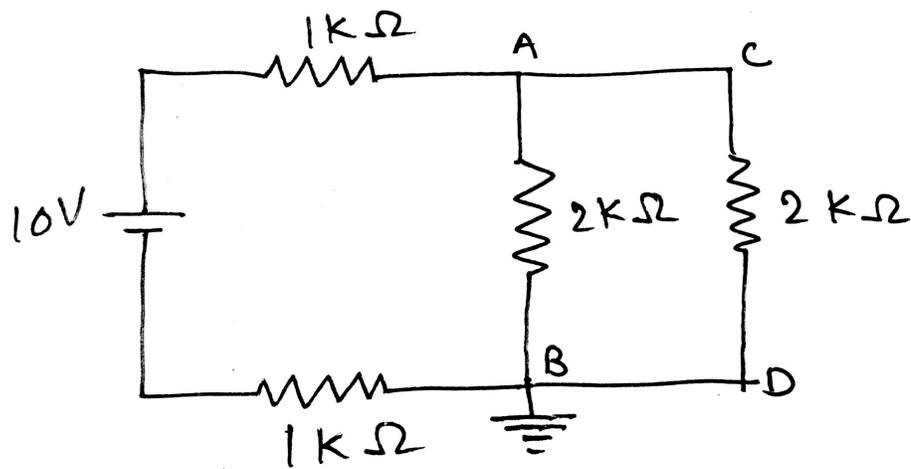
Appendix

Scilab code AP 1 1 33.22
2 462.
3 27.11
4 383.22

<u>text file for Experiment number 7</u>

Circuit Diagram For Experiment 5