Scilab Textbook Companion for Network Analysis And Synthesis by B. R. Gupta[1]

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Book Description

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Scilab numbering policy used in this document and the relation to the above book.

Exa Example (Solved example)

Eqn Equation (Particular equation of the above book)

AP Appendix to Example(Scilab Code that is an Appednix to a particular Example of the above book)

For example, Exa 3.51 means solved example 3.51 of this book. Sec 2.3 means a scilab code whose theory is explained in Section 2.3 of the book.

Contents

List of Scilab Codes

Chapter 1

Introduction to electronic circuits

Scilab code Exa 1.1 Resistance

```
1   //CHAPTER1  EX 1-1   PG NO 17
2 L=5*10^-3;    //length
3 B=2*10^-2;   //breath
4 A=(5*10^-3)*(2*10^-2);    //area
5 P=1.72*10^-5 ;  //resistivity of copper
6 R=P*L/A;    //resistance of copper
7 disp('i) resistance = '+string (R)+' ohm');
8 R=P*L/A;                  //resistance in ohm
```

Scilab code Exa 1.2 Diameter

```
1                           //EXAMPLE 1-2    PG NO 18
2 R=0.69;                   //RESISTANCE
3 P=2.83*10^-8;                  //PRO
4 L=60;                 //LENGTH OF CABLE
5 a=(P*L)/R;
```

```
6 disp('i) a = '+string (a)+' m^2');
7 D=[(4*a)/%pi]^0.5;                    //DIAMETER
8 disp('i) DIAMETER = '+string (D)+' mm');
```

Scilab code Exa 1.3 Alpha Rise in Temperature

```
1   //EXAMPLE 1-3   PG NO-18
2 A20=0.00393;  //ALPHA 20
3 R30=1.3;  //RESITANCE 30
4 A30=A20/(1+A20*(30-20));  //ALPHA 30
5 disp('i)Alpha30 (A30) = '+string (A30)+' ');
6 T=[((1.6/1.3)-1)/0.00378];   // THE RISE IN
    TEMPERATURE TO BE FIND    where T=t-30
7 disp('ii)Resistance Temperature (t-30) = '+string (T
    )+' degree celcious');
```

Scilab code Exa 1.4 Current

```
1                                          //EXAMPLE 1-4
                                                PG NO
                                                  18-19
2 R1=2.22;                                //RESISTANCE
3 R2=0.6;                                 //RESISTANCE
4 R3=3;                                   //Resistance
5 R4=4;
6 R5=5;
7 R6=6;
8 R7=2;
9 R=R1+R2+R3;
10 disp('i) Resistance (R) is    =  '+string ([R]) +'
    ohm  ');
11 V=12;                                   //VOLTAGE
12 I=V/R;                                   //Current
```

```
13 disp('ii) CURRENT (I) is     =  '+string ([I]) +' A
    ');
14 I3=I;

    //CURRENT THROUGH 3 ohm RESISTANCE
15 disp('iii) CURRENT (I3) is     =  '+string ([I3]) +'
    A  ');
16 I5=(I3*R4)/(R4+R5);
                                                //CURRENT
    THROUGH 5 ohm RESISTANCE
17 disp('iv) CURRENT (I5)  is     =  '+string ([I5]) +'
    A  ');
18 I4=(I3*R5)/(R4+R5);
                                                //CURRENT
    THROUGH 4 ohm RESISTANCE
19 disp('v) CURRENT (I4)  is     =  '+string ([I4]) +' A
     ');
20 V1=1.236;                                              //
    VOLTAGE ACROSS THREE PARALLEL RESISTANCE
21 I2=V1/R7;                                               //
    current
22 disp('vi) CURRENT (I2)  is     =  '+string ([I2]) +'
    A  ');
23 I1=V1;
                                                          //
    CURRENT THROUGH 1 ohm RESISTANCE
24 disp('iv) CURRENT (I1)  is     =  '+string ([I1]) +'
    A  ');
25 I6=V1/R6;
                                                          //
    CURRENT THROUGH 6 ohm RESISTANCE
26 disp('vii) CURRENT (I6)  is     =  '+string ([I6]) +'
    A  ');
```

Scilab code Exa 1.5 Power and Resistance

```
1                          //EXAMPLE 1-5  PG NO-19
2 V1=230;  //VOLTAGE  ONE
3 P1=1000;    //POWER
4 R=V1*V1/P1;    //RESISTANCE OF HEATER
5 V2=210;  //VOLTAGE  TWO
6 P2=V2*V2/R;       //POWER OF HEATER WHEN VOLTAGE IS
     210
7 R=(V1*V1)/P1                    //Resistance
8 disp('i)RESISTANCE = '+string (R)+' ohm');
9 P2=(V2*V2)/R;                    //Power
10 disp('ii)POWER = '+string (P2)+' ohm');
```

Scilab code Exa 1.6 cost quantity of electricity number of electron rate of electr

```
1        //EXAMPLE 1-6    PG NO-19-20
2 I=12;   //CURRENT
3 V=230;   //VOLTAGE
4 P=1000;   //POWER
5 T=3;   //TIME
6 S=3600;
7 E=(I*V/P)*T;   //ENERGY USED
8 Q=I*T*S;   //QUANTITY OF ELECTRICITY USED
9 IC=6.24*10^18;
10 N.C=IC*Q;   //NUMBER OF ELECTRON
11 R=I*V;   //RATE OF ENERGY
12 disp('i) ENERGY = '+string (E)+' KWh');
13 disp('ii) QUANTITY = '+string (Q)+' C');
14 disp('iiI) NUMBER OF ELECTRON = '+string (N.C)+' ');
15 disp('iiII) RATE OF ENERGY = '+string (R)+' W');
```

Scilab code Exa 1.7 Power current voltage

```
1                          //Example 1_7  PG NO-20
```

```
I1=3;          //current
I2=1;          //current
R=4;          //Resistor
I=I1-I2;     //current through resistance
disp('i)Current Through resistance (I) = '+string (I
    )+' A');
P=I*I*R;
disp('ii)Power dissipated in resistor (P) = '+string
     (P)+' W');
V=I*R;
disp('iii)voltage (V) = '+string (V)+' V');
P1=V*I1;          //power dissipated with 3A source
disp('iv)power dissipated with 3A source (P1) = '+
    string (P1)+' W');
```

Scilab code Exa 1.11 Temperature coefficient

```
                                //EXAMPLE 1-11
                                                PG NO-21
R55=58;                          //resistance
R15=50;                          //Resistance
T1=55;                         //Temperature
T2=15;                           //Temperature
A15=[(R55/R15)-1]/(T1-T2);                  //alpha 15
disp('i) ALPHA (A15)   =  '+string (A15)+' ');
T3=0;
A2=A15/[1+A15*(T3-T2)];                      //Alpha 2
disp('ii)  ALPHA (A2)   =  '+string (A2)+' ');
```

Scilab code Exa 1.13 Resistance total power

```
                    //EXAMPLE 1-13  PG NO 21-22
R=10;  //RESISTANCE
```

```
3 V=230; //VOLTAGE
4 P=(V*V)/R;                                    //POWER
5 disp('i) POWER = '+string (P)+' W')
```

Scilab code Exa 1.14 Resistance

```
1                                                    //EXAMPLE
                                                       1-14

                                                       PG NO-22
2 R1=4;                                  //Resistance
3 R2=2;                                  //Resistance
4 R3=8;                                      //Resistance
5 RS=R1+R2;                                                    //
    resistance  When Point A&B is short circuit
6 disp('i)resistance  When Point A&B is short circuit
     = '+string (RS)+' ohm');
7 RO=R1+R2+R3;
    //resistance  When Point A&B is   open circuit
8 disp('i)resistance  When Point A&B is open circuit
    = '+string (RO)+' ohm');
```

Scilab code Exa 1.15 RESISTANCE CURRENT

```
1                                        //EXAMPLE 1-15
                                           PG NO-22
2 I1=0.04;                          //CURRENT
3 I2=0.01;                             //CURRENT
4 V1=200;                              //VOLTAGE
5 R=V1/I1;                             //Resistance
6 disp('i)resistance   (R)   = '+string (R)+' ohm');
7 V2=10;                               //VOLTAGE
8 I3=50;                                //CURRENT
```

```
A=0.1;                    //AMMETER RESISTANCE
R1=(V2/I3)-0.1;
disp('i)Resistance  (R1)  = '+string (R1)+' ohm');
V3=5000;
V4=250;
I=I3/V3;
disp('i)Current  (I)  = '+string (I)+' A');
R2=(V4-I3)/I;
disp('i)resistance  (R2)  = '+string (R2)+' ohm');
```

Scilab code Exa 1.16 ENERGY PERCENTAGE OF ENERGY

```
                                    //EXAMPLE 1-16
                                                PG NO-23
V=1;                          //ASSUMING
t=1;                                    //ASSUMING
R1=30;                          //RESISTANCE
R2=20;
R3=10;
E30=(V/R1)*t;                                   //ENERGY AT
    30 ohm RESISTANCE
disp('i)    ENERGY = '+string (E30)+' ');
E20=(V/R2)*t;                                  //ENERGY AT 20
    ohm RESISTANCE
disp('ii)  ENERGY = '+string (E20)+' ');
E10=(V/R3)*t;                                   //ENERGY AT
   10 ohm RESISTANCE
disp('iii)    ENERGY = '+string (E10)+' ');
TE=E30+E20+E10;                          //TOTAL ENERGY
disp('iv)    TOTAL ENERGY = '+string (TE)+' ');
PTE=(E30/TE)*100;                          //PERCENTAGE OF
   TOTAL ENERGY
disp('ii)    PERCENTAGE OF TOTAL ENERGY = '+string (
   PTE)+'% ');
```

Scilab code Exa 1.17 EMF

```
1                                   //EXAMPLE 1-17
                                      PG NO-23
2 N=10^3;                        //Number of Turns
3 a=6.25*10^-4;                        //Diameter
4 l=0.25;
5 L=(N*N*4*%pi*10^-7*a)/(%pi*l);                  //
    INDUCTANCE
6 disp('i)inductance = '+string (L)+' H');
7 e=L*100;                                    //EMF
8 disp('ii)EMF = '+string (e)+' V')
```

Scilab code Exa 1.18 Inductance of Coil

```
1                                      //EXAMPLE 1-18
                                                PG NO-23
2 E=0.05;                           //ENERGY
3 i=0.1;                              //CURRENT
4 L=2*E/i^2                           //INDUCTANCE OF COIL
5 disp('i)inductance = '+string (L)+' H')
```

Scilab code Exa 1.19 Inductance

```
1                                 //EXAMPLE 1-19       PG NO
                                    23
2 i=0.184                        //derivative      of I
3 e=0.16;
4 L=e/i;                        //Inductance
5 disp('i)Inductance = '+string (L)+' H')
```

Scilab code Exa 1.20 Resistance

```
1                                   //EXAMPLE 1-20    PG NO-24
2 A=20*10^-6;
3 L=30;
4 P20=1.72*10^-8;
5 R20=P20*L/A;
6 X0=0.00426;
7 I=5;
8 X20=X0/[1+(X0*20)];
9 R55=R20*(1+X20*(55-20));
10 P=I*I*R55;
11 disp('i)RESISTANCE = '+string (R20)+' ohm');
12 disp('i) ALPHA 20(X20)= '+string(X20)+' ohm');
13 disp('i)RESISTANCE = '+string (R55)+' ohm')
14 disp('i)POWER = '+string (P)+' w')
```

Scilab code Exa 1.21 Voltage Across Inductor

```
1                       //EXAMPLE 1-21                    PG NO
                          -24
2 L=200*10^-3;                              //INDUCTAR
3 t1=1;                       //di/dt=(-2e^-t+4e^-2t)
     =-1.9*10^-7;
4 V=L*(-1.94*10^-7);                          //VOLTAGE AT
     TIME 1
5 disp('i)  Voltage  = '+string (V)+'V ');
6 t2=0.1;                                              //di/dt=(-2
     e^-t+4e^-2t)^2=0.216;
7 V1=L*0.5*(0.216);                           //VOLTAGE AT
     TIME O.1
8 disp('ii)  Voltage  = '+string (V1)+'V ');
```

Scilab code Exa 1.26 Inductor

```
1                                   //EXAMPLE 1-26        PG NO 27
2 L1=(1.1-0.8)/0.75;                                  //Inductance
3 disp('i)Inductance = '+string (L1)+' H')
4 L2=3*L1;                                  //Inductance
5 disp('ii)Inductance = '+string (L2)+' H')
```

Scilab code Exa 1.27 Flux

```
1 //EXAMPLE 1-27      PG NO27
2 L1=50*10^-3;                        // Inductar
3 L2=100*10^-3;                        //Inductar
4 X=(L1/L2);
5 disp('i)     (L1/L2) = '+string (X)+' ')
6 //Q1+Q2=600;
7 Q11=200;                 //flux
8 Q22=400                 //flux
9 disp('ii) Flux    Q11 = '+string (Q11)+' mWb');
10 disp('iii) Flux     Q22 = '+string (Q22)+' mWb');
```

Scilab code Exa 1.28 Capacitor

```
1                                   //EXAMPLE 1-28        PG NO-27
2 C1=60;                             //TWO CAPACITOR CONNECTED IN
      SERIES
3 EC=(C1*C1)/(C1+C1);                                    //
     EQUIVALENT CAPACITOR
```

```
4 disp('i) Equivalent Cpacitor (EC) is = '+string
    (EC) +' microF ');
```

Scilab code Exa 1.29 Equivalent Capacitor

```
1                          //EXAMPLE 1-29      PG NO
                             -27-28
2 C1=12;                   //CAPACITOR
3 C2=4;                    //CAPACITOR
4 C3=8;
5 C4=7;
6 C1=(C1*C2)/(C1+C2);                        //CAPACITOR
    IN SEREIS
7 disp('i)    Capacitor = '+string (C1)+' muF')
8 C2=(C3*C4)/(C3+C4);                        //CAPACITOR
    IN PARALLEL
9 disp('i)    Capacitor = '+string (C2)+' muF')
```

Scilab code Exa 1.30 VLTAGE AND ENERGY

```
1                          //EXAMPLE 1-30          PG NO
                             -28
2 Q=80*10^-4;    //COULUMB CHARGR
3 C=150*10^-6;
4 C1=100*10^-6;  //CAPACITANCE
5 C2=50*10^-6;
6 Va=Q/C1;
7 Vb=Q/C2;
8 E1=(0.5*C1*Va*Va)+(0.5*C2*Vb*Vb);     //ENERGY
9 E2=0.5*C*(Va+Vb)*(Va+Vb);
10 disp('i)variable = '+string (Va)+' ohm')
11 disp('i)variable = '+string (Vb)+' ohm')
12 disp('i)energy = '+string (E1)+' J')
```

```
13 disp('i)energy = '+string (E2)+' J')
```

Scilab code Exa 1.32 Current and Resistance

```
1    //EXAMPLE 1-32  PG NO-29
2 V=10;                  //VOLTAGE
3 R1=2;
4 R2=8;                 //RESISTANCE
5 I1=V/(R1+R2);    //CURRENT
6 I2=1.25;          //CURRENT THROUGH SECOND BRANCH
7 R=V/I2-5;
8 disp('i)CURRENT = '+string (I1)+' A')
9 disp('ii)RESISTANCE = '+string (R)+' ohm')
```

Scilab code Exa 1.33 Introduction of Electric Circuits

```
1                    //EXAMPLE 1-33        PG NO-29-30
2 R1=29980;    //RESISTANCE
3 I1=9.99;              //current
4 R2=20;
5 I2=0.01;      //current
6 r=20*0.01/9.99;            //resistance
7 disp('i)resistance = '+string (r)+' ohm')
```

Scilab code Exa 1.34 Power

```
1                    //Example   1-34              PG
                       NO-30
2 V=20;                  //VOLTAGE
3 R1=5;                  //Resistance
```

```
4 X=7.5;
5 P=(20/(R1+X))^2*(X);                    //Power
6 disp('i)  Power (P) is    =  '+string (P) +'  W ');
```

Scilab code Exa 1.35 Resistance

```
1                                          //EXAMPLE 1-35
                                             PG NO 30-31
2 I1=4;                                 //Current
3 I2=6;                                   //Current
4 V=110;                                    //Voltage
5 Vab1=V-(6+4)*2;
6 VB=80;
7 VC=50;
8 R11=(Vab1-VB)/I1;
9 R12=(Vab1-VC)/I2;
10 Vab2=V-(-2+20)*2;                              //Voltage
11 R21=(VB-Vab2)/2;                             //Resistance
12 R22=(Vab2-VC)/20;                           //Resistance
13 I=(V-VB)/2;                               //Current
14 R=(VB-VC)/I;                           //Resistance
15 disp('i)variable = '+string (Vab1)+' ohm')
16 disp('ii)resistance = '+string (R11)+' ohm')
17 disp('iii)resistance = '+string (R12)+' ohm')
18 disp('iv)variable = '+string (Vab2)+' ohm')
19 disp('v)resistance = '+string (R21)+' ohm')
20 disp('vi)resistance = '+string (R22)+' ohm')
21 disp('vii)    resistance    = '+string (R) + ' ohm')
22 disp('viii)  Current = '+string   (I) + ' A')
```

Scilab code Exa 1.36 change flux flux change voltage energy in inductor

```
1 //EXAMPLE 1-36     PG NO-31
```

```
2 T=0.99425;      //TIME
3 disp('i)Time = '+string (T)+' seconds')
4 X=0.37;         //DERAVATIVES OF 'I' W.R.T
5 disp('ii)(di\dt) = '+string (X)+' A\sec')
6 LI=0.63;        //CURRENT
7 dli=0.37;       // deravatives of 'SI' w.r.t
8 disp('iii)(dsi\dt) = '+string (dli)+' Wb-turns\sec')
9 VL=dli;
10 disp('iv)(VL) = '+string (VL)+' V')
11 Ri=0.63;
12 VR=Ri;
13 disp('v)VR = '+string (VR)+' V')
14 E=0.5*LI*LI;      //ENERGY
15 disp('vi)ENERGY stored in magnetic field = '+string
    (E)+' J')
16 E1=LI*X;     //ENERGY STORED IN MAGNETIC FIELD
17 H=Ri*Ri;       //HEAT
18 disp('vii) Rate of Energy stored in magnetic field =
    '+string (E1)+' W')
19 disp('viii)Rate of dissipation of heat in resistor =
    '+string (H)+' W')
20 disp('ix)Rate of supply of battery energy = '+string
    (Ri)+' W')
```

Scilab code Exa 1.37 Current

```
1 T=2000;      //TEMPERATURE
2 T1=15;      //ROOM TEMPERATURE
3 V=220;   //VOLTAGE
4 P=40;   //POWER
5 A15=0.005;
6 R=V*V/P;    //RESISTANCE
7 R15=R/(1+A15*(T-T1));    //RESISTANCE AT TIME OF
    SWITICHING
8 I=V/R15;        //CURRENT
```

```
9  disp('i)resistance  = '+string (R)+' ohm')
10 disp('ii)resistance  = '+string (R15)+' ohm')
11 disp('iii)current   =  '+string (I)+' A')
```

Scilab code Exa 1.38 Current

```
1                          //EXAMPLE  1-38        PG NO-32
2  F=50;                          //Frequency
3  W=2*%pi*F;
4  disp('i)W  = '+string (W)+' rad/sec');
5  t=0.0025;                      //time
6  Vm=10;
7  A1=0.01;
8  A2=0.005;
9  i=[(A2*Vm^2)/2]+0.0707;
10 disp('ii)Current = '+string (i)+' A')
```

Scilab code Exa 1.39 Insulation resistance

```
1                        //EXAMPLE 1-39     PG NO-32-33
2  V=440;                  //voltage
3  V1=5;                     //voltage
4  R=40;                //resistance
5  V2=220;
6  V3=100;
7  Rv=(V3*R)/[V2-V3];              //insulation
     resistance
8  disp('i)Resistance (Rv) = ' + string (Rv)+' Kohm')
9  Ri=[Rv*(V-V1)]/V1;              //insulation
     resistance
10 disp('iii)Resistance(Ri) = '+string (Ri)+' Kohm')
```

Scilab code Exa 1.40 Resistance

```
1                                   //EXAMPLE 1-40          PG
                                      NO-33
2 P=1.72*10^-8;                     //PRO
3 t=0.03;                          //distance
4 R=[(4*P)/(%pi*0.03)]*0.47;                  //Resistance
5 disp('i)     Resistance = '+string (R)+' ohm')
```

Scilab code Exa 1.41 Resistance

```
1                                  //EXAMPLE 1-41          PG
                                     NO-33
2 P=1.72*10^-8;                      //PRO
3 t=0.03;
4 R=[(P*%pi)/(4*0.03*0.47)];
5 disp('i)     Resistance = '+string (R)+' ohm')
```

Scilab code Exa 1.42 Resistance

```
1                        //EXAMPLE 1-42          PG NO-34
2 P=100;                     //pro
3 L=0.5;                     //inductance
4 r1=0.15;                    //radius
5 r2=0.075;                   //radius
6 R=[100/(2*%pi*L)]*(0.731);              //resistance
7 disp('i)     Resistance = '+string (R)+' ohm')
```

Scilab code Exa 1.44 voltage

```
1                       //EXAMPLE 1-44  PG NO-36
2 R1=12;                    //Resistance
3 R2=0.2;                     //Resistance
4 R3=15;
5 V1=[-(R2*R3)+R1]/3;                    //voltage drop
6 disp('i) VOLTAGE  = '+string (V1)+' V');
```

Scilab code Exa 1.46 current

```
1                  //EXAMPLE 1-46      PG NO37
2 A=[85 -25;-25 135];           // Finding current
3 B=[60;100];
4 X=A\B;                  //  current
5 disp('i)CURRENT = '+string (X)+' A')
6 I1=0.977;
7 I2=0.922;           //WE HAVE FOUNDED  I1 and I2
8 I3=I1-I2;
9 disp('ii)CURRENT = '+string (I3)+' A')
```

Scilab code Exa 1.47 Resistance

```
1                  //EXAMPLE 1-48 PG NO-39-40
2 R1=4;                             //Resistance
3 R2=4;                           //Resistance
4 R3=8;                             //Resistance
5 RA=(R1*R2)/(R1+R2+R3);
6 disp('i)RESISTANCE = '+string (RA)+' ohm');
7 RB=(R1*R3)/(R1+R2+R3);
8 disp('ii)RESISTANCE = '+string (RB)+' ohm');
9 RC=(R2*R3)/(R1+R2+R3);
10 disp('iii)RESISTANCE = '+string (RC)+' ohm')
```

Scilab code Exa 1.48 Current

```
1                    //EXAMPLE 1-48 PG NO-39-40
2  R1=6.8;                        //Resistance
3  R2=15;
4  R3=10;
5  RA=(R1*R2)/(R1+R2+R3);
6  disp('i)RESISTANCE = '+string (RA)+' ohm');
7  RB=(R1*R3)/(R1+R2+R3);
8  disp('ii)RESISTANCE = '+string (RB)+' ohm');
9  RC=(R2*R3)/(R1+R2+R3);
10 disp('iii)RESISTANCE = '+string (RC)+' ohm')
```

Scilab code Exa 1.50 voltage

```
1                    //EXAMPLE 1-50        PG NO-45
2  TR=17/6;                         //TOTAL RESISTANCE
3  V=40;                            //VOLTAGE
4  I=5;                              //CURRENT
5  Vs=(TR*I)-V;
6  disp('i)VOLTAGE = '+string (Vs)+' V')
```

Scilab code Exa 1.51 Power

```
1                      //EXAMPLE 1-51        PG NO-45-46
2  TR=2.05;                  //TOTAL  RESISTANCE
3  V=2;                      //VOLTAGE
4  P=V^2/TR;                                  //ower
5  disp('i)POWER = '+string (P)+' W')
```

Scilab code Exa 1.52 equvalent inductance

```
1                          //EXAMPLE  1-52     PG NO-46
2 L1=1;
3 L2=1;
4 L3=1;                        //INDUCTANCE
5 DL1=[(L1*L2)+(L2*L3)+(L3*L1)]/(L1*L2*L3);
6 disp('i)DELTA INDUCTANCE = '+string (DL1)+' H')
7 L4=1.5;
8 L5=1.5;                            //Inductance
9 L6=1.5;
10 L=[L4*(L5+L6)]/[L4+L5+L6];
11 disp('ii)INDUCTANCE = '+string (L)+' H')
```

Scilab code Exa 1.53 equvalent resistance

```
1                      //EXAMPLE 1-53          PG NO-46-47
2 R1=200;                        //RESISTANCE
3 R2=50;
4 R3=30;
5 R4=20;
6 Rab=[R1*(R2+R3+R4)]/(R1+R2+R3+R4);                    //
    equvalent     resistance
7 disp('i)RESISTANCE = '+string (Rab)+' ohm')
```

Chapter 2

single phase AC Circuits

Scilab code Exa 2.1 average value RMS Value Form Factor Peak Factor RMS Value of s

```
1                    //EXAMPLE-2-1                EXAMPLE
                       -59
2  t=0.5;
3  x=115;
4  z=310.6                    //time
5  A.V=0.2*x;  //average value
6  R.M.S=(1/10)*z;                          //rms value
7  F=R.M.S/A.V;                           //form factor
8  P.F=60/R.M.S;                        //peak  factor
9  S=60/(2)^0.5;                         //rms value of
       sine wave
10 disp('i)R.M.S   =  '+string (R.M.S)+' V')
11 disp('i) average value   =  '+string (A.V)+' V')
12 disp('i)orm factor   =  '+string (F)+' ')
13 disp('i peak factor   =  '+string (P.F)+' ')
14 disp('i)sine wave   =  '+string (S)+' V')
```

Scilab code Exa 2.3 Form Factor Peak Factor

```
1       //EXAMPLE 2-3  PG NO-59-60
2  Vm=1;
3  AV1=0.318*Vm;                    //avegare value
4  RMS1=0.5*Vm;                      //RMS value
5  FF1=RMS1/AV1;                        //Form Factor
6  PF1=Vm/RMS1;                         //Peak Factor
7  AV2=0.637*Vm;                     //Average    value
8  RMS2=0.707*Vm;                     //RMS  value
9  FF2=RMS2/AV2;                       //Form Factor
10 PF2=Vm/RMS2;                        //Peak Factor
11 disp('i)Form Factor   =  '+string (FF1)+' ')
12 disp('i)peak Factor   =  '+string (PF1)+' ')
13 disp('i)Form Factor   =  '+string (FF2)+' ')
14 disp('i)PEAK Factor   =  '+string (PF2)+' ')
```

Scilab code Exa 2.7 addition and substraction

```
1                          //EXAMPLE 2-7       PG NO
                             64-65
2  V1=24.15+%i*6.47;                    //VOLTAGE
3  V2=7.5+%i*12.99;                       //VOLTAGE
4  X=V1+V2;                            //ADITION fo v1&v2
5  disp('i)ADITION  is in rectangular  form =  '+string
       (X)+' V')
6  X1=V1-V2;                           //subsraction     of
     v1&v2
7  disp('i)substraction  is in rectangular  form =  '+
     string (X1)+' V')
```

Scilab code Exa 2.8 ADDITION SUBSTRACTION MULTIPLICATION DIVISION

```
1                                  //EXAMPLE 2-8       PG
                                     NO-65
```

```
2  A=3+%i*1;
3  B=4+%i*3;
4  X=A+B;                          //ADDITION
5  Y=A-B;                            //SUBSTRACTION
6  Z=A*B;                            //MULTIPLICATION
7  U=A/B;                            //DIVISION
8  V=A^4;
9  P=B^(1/3);
10 disp('ii)   ADDITION (A+B) is in polar form = '+
     string (X) +' ohm ');
11 disp('ii)   SUBSTRACTION (A-B) is in polar form =
     '+string (Y) +' ohm ');
12 disp('ii)   MULTIPLICATION (A*B) is in polar form
     = '+string (Z) +' ohm ');
13 disp('ii)   DIVISION (A/B) is is in polar form =
     '+string (U) +' ohm ');
14 disp('ii)   SQUARE OF A(A^4) is in polar form =
     '+string (V) +' ohm ');
15 disp('ii)   CUBE ROOT OF B (B^(1/3)) is in polar
     form = '+string (P) +' ohm ');
```

Scilab code Exa 2.9 Rate of change of current

```
1                                  //EXAMPLE 2-9
                                     PG NO-65
2  t1=0.0025;                                //time
3  t2=0.005;                                 //time
4  t3=0.01;                                  //time
5  i1=10*314.16*cos(314.16*t1);                        //
     i1 is derivatives of i wrt t;
6  disp('i)  Current = '+string (i1)+'A ');
7  i2=10*314.16*cos(314.16*t2);
8  disp('ii)  Current = '+string (i2)+'A ');
9  i3=10*314.16*cos(314.16*t3);
10 disp('iii)  Current = '+string (i3)+'A ');
```

Scilab code Exa 2.10 rms

```
1              //EXAMPLE 2-10  PG NO-66
2 I1=5;                      //current
3 I2=7.071;                    //current
4 RMS=(I1*I1+I2*I2)^0.5;              //resultant
     rms value
5 disp('i) RMS   =  '+string (RMS)+'A ')
```

Scilab code Exa 2.11 INSTANTANEOUS VALUE

```
1                 //EXAMPLE 2-11      PG NO-66
2 W=314.16;
3 PV=14.14;                        //PEAK VALUE
4 t=0.0025;                        //TIME
5 i=PV*sin(W*t);                  //CURRENT
6 T=0.0175;                     //TOTAL TIME
7 I=PV*sin(W*T);
8 disp('ii)   CURRNT (i) is     =  '+string (i) +'    ')
     ;
9 disp('ii)   CURRNT (I) is     =  '+string (I) +'    ')
     ;
```

Scilab code Exa 2.12 current

```
1                      //EXAMPLE 2-12          PG NO-66-67
2 W1=80*%pi;                  //womega
3 W2=100*%pi;
4 PV=14.14;               //peak value
```

```
5  t1=0.025;                    //time
6  t2=0.05;
7  t3=0.075;
8  I1=PV*(cos(80*%pi*t1)+cos(100*%pi*t1));
                              //current
9  I2=PV*(cos(80*%pi*t2)+cos(100*%pi*t2));
                              //current
10 I3=PV*(cos(80*%pi*t3)+cos(100*%pi*t3));
                              //current
11 disp('ii)    CURRNT (I) is     =   '+string (I1) +'  A'
      );
12 disp('ii)    CURRNT (I) is     =   '+string (I2) +' A
      ');
13 disp('ii)    CURRNT (I) is     =   '+string (I3) +'  A
      ');
```

Scilab code Exa 2.13 Average Value of Voltage

```
1                          //EXAMPLE 2-13          PG NO-67
2  T=20*10^-3;                        //TIME PERIOD
3  Ta=300*10^-3;                     //TOTAL AREA
4  A=(Ta)/T;                         //AVERAGE VALUE
5  disp('ii)    AVERAGE VALUE (A) is     =   '+string (A)
      +'  V ');
```

Scilab code Exa 2.14 Effective Value Form Factor

```
1                       //EXAMPLE 2-14          PG NO-67
2  Ta=5;                              //TOTAL  AREA
3  T=20*10^-3;                       //TIME
4  Av=Ta/T;                         //AVERAGE  VALUE
5  Ev=[Av]^0.5;                     //EFFECTIVE VALUE
6  FF=Ev/15;                         //FORM FACTOR
```

```
7 disp('ii)   AVERAGE VALUE (Av) is    =  '+string (Av
    ) +'   ');
8 disp('ii)   EFFECTIVE VALUE (Ev) is    =  '+string (
    Ev) +'  V ');
9 disp('ii)   FORM FACTOR (FF) is    =  '+string (FF)
    +'   ');
```

Scilab code Exa 2.15 Average Value Effective Value Form Factor

```
1 Eav=50;                          //in volts
2 T=2;                            //time
3 E=[(1/T)*2500*2.66]^0.5;                    //energy
                //integrate('0','t',2)=2.66
4 disp('i) Energy  = '+string (E)+'V ');
5 FF=E/Eav;                                          //form
    factor
6 disp('i) Form Factor  = '+string (FF)+' ');
```

Scilab code Exa 2.16 ENERGY FORM FACTOR

```
1                                  //EXAMPLE 2-16          PG
                                       NO 68
2 Eav=2.5;                         //AVERAGE ENERGY
3 E=8.333;
4 disp('i)   ENERGY (E) is    =  '+string (sqrt(E)) +'
    V  ');
5 FF=sqrt(E)/Eav;
6 disp('ii)   Form  Factor (FF) is    =  '+string (FF)
    +'   ');
```

Scilab code Exa 2.17 RMS

```
1                                   //EXAMPLE 2-17          PG NO-69
2 I1=10;                                    //CURRENT
3 I2=-4;
4 I3=2;
5 I4=0;
6 T=8;                                  //TIME
7 Irms=[({I1*I1*2}+{I2*I2*2}+{I3*I3*2}+{I4*I4*2})/T
    ]^0.5;                  //RMS
8 disp('ii)   CURRENT R.M.S (Irms) is    =  '+string (
    Irms) +'  A ');
```

Scilab code Exa 2.20 Voltage

```
1                                           //EXAMPLE 2-20
                                                          PG NO-70
2 T=0.03;                                   //TIME
3  // (1000*integrate('0','t',0.01,0.01))^2=-0.333
4  //100*integrate('0.01','t',0.02,0.02)=-1
5  //integrate('0.02',  '',0.03,0.03)]=0
6 V=(-0.33-1)/T;
7 disp('i) Voltage  (V) is   =  '+string (V) +' V ');
8 disp('i) Square Root of Voltage  (V) is   =  '+
    string (sqrt(-V)) +' seconds ');
```

Scilab code Exa 2.21 Voltage

```
1                                   //EXAMPLE 2-21
                                                          PG NO-70
2 T=0.05;                                   //TIME
3  // (400*integrate('0','t',0.025,))^2=--0.8333
4  //100*integrate('0.01','t',0.02,0.02)=-1.738
```

```
5 V=(-0.833-1.738*10^-86)/T;
6 disp('i) Voltage (V) is = '+string (V) +' V ');
7 disp('i) Square Root of Voltage (V) is = '+
    string (sqrt(-V)) +' seconds ');
```

Scilab code Exa 2.22 Average

```
1                          //EXAMPLE 2-22      PG NO-70-71
2 A=%pi/2;
3                                  //integrate(wt)=%pi/6
4 Eavg=1/A*(%pi+%pi)/6;
5 disp('i) Average Energy (Eavg) is = '+string (
    Eavg) +' Em ');
```

Scilab code Exa 2.23 Average Energy

```
1              //EXAMPLE 2-23      PG NO-71
2 A=%pi/2;
3                                  //[integrate('0',wt,'%pi
                                     /3')]^2=%pi/9
4                                  //integrate('%pi/3',wt,'%pi
                                     /2')=%pi/6;
5 E=1/A*[(%pi/9)+(%pi/6)];
6 disp('i) Energy (E) is = '+string (E) +' ');
7 disp('ii) Square Energy (E) is = '+string (sqrt(
    E)) +' ');
8 FF=[sqrt(E)*3]/2;
9 disp('iii) FORM FACTOR (FF) is = '+string (FF)
    +' ');
```

Scilab code Exa 2.24 Current

```
1                    //EXAMPLE 2-24    PG NO 71
2 //integration of    is=1008sinQ^2=0.5
3 I=150                          //CURRENT
4 disp('i)  CURRENT  (I^2) is   =  '+string (I) +' A '
     );
5 disp('ii)  CURRENT  (I) is   =  '+string (sqrt(I)) +
     ' A ');
```

Scilab code Exa 2.25 VOLTAGE

```
1                        //EXAMPLE 2-25  PG NO-72
2 V1=50+%i*0;
3 V2=37.5-%i*64.95;
4 X=V1+V2;                    //ADDITION  OF V1&V2
5 disp('ii)   ADDITION (X) is  in polar form  =  '+
    string (X) +'  V ');
```

Scilab code Exa 2.26 Reading of moving coil Reading of hot wire Total Power Power

```
1                              //EXAMPLE 2-26        PG NO-72
2 V=200;
3 R=100;
4 R1=500;
5 R2=0.9009;                              //resistance
6 RMS1=V/(R+R);                             //RMS
7 disp('ii)   CURRENT R.M.S  in forward (R.M.S.1) is
      =  '+string (RMS1) +'  A ');
8 RMS2=-V/(R+R1);
9 disp('ii)   CURRENT R.M.S  in Backward (R.M.S.2) is
      =  '+string (RMS2) +'  A ');
10 I1=RMS1*R2;                                  //Current
```

```
11 disp('ii) Average CURRENT in forward (I1) is =
       '+string (I1) +' A ');
12 I2=RMS2*R2;
13 disp('ii) Average CURRENT in Backward (I2) is
     = '+string (I2) +' A ');
14 A=[I1+I2]/2;                                  //Ammeter
15 disp('ii) Reading of moving coil ammeter (A) is
       = '+string (A) +' A ');
16 H.A=[0.5*[RMS1+(RMS2)^2]]^0.5;                          //
     HOT AMMETER
17 disp('ii) Reading of hot wire ammeter (H.A) is
     = '+string (H.A) +' A ');
18 P=0.5*[(RMS1*V)+(RMS2*RMS2*600)];
                                  //POWER
19 disp('ii) TOTAL AVERAGE POWER (P) is = '+
     string (P) +' W ');
20 P1=0.5*[(RMS1*R)+(RMS2*RMS2*R1)];
21 disp('ii) TOTAL POWER dissipated in rectifier (P
     ) is = '+string (P1) +' W ');
```

Scilab code Exa 2.27 CURRENT POWER DISSIPATED INSTANTANEOUS CURRENT

```
1         //EXAMPLE 2-27  PG NO 74
2 F=50
3 V=230;              //voltage
4 R=20;               //resisance
5 I=V/R;              //current
6 P=V*I;              //power
7 Im=I*1.414;            //Maximum current
8 W=2*%pi*F;
9 disp(' current is = '+string(I)+' A');
10 disp(' POWER is = '+string(P)+' W');
11 disp(' MAXIMUM CURENT is = '+string(Im)+' A');
12 disp(' W is = '+string(W)+' ');
```

Scilab code Exa 2.28 FREQUENCY

```
1      //EXAMPLE 2-28  PG NO-76
2 F=50;    //Frequency
3 L=0.2;   //inductance
4 XL1=500;
5 XL=(2*%pi*F*L);
6 f=XL1/(2*%pi*L);                    //FREQUENCY
7 disp(' XL  is    = '+string(XL)+' ohms');
8 disp(' frequency  is    = '+string(f)+' Hz');
```

Scilab code Exa 2.29 Capacitive Reactance susceptance and current

```
1       //EXAMPLE 2-29  PG NO=77-78
2 V=230;
3 F=50;        //Frequency
4 C=10*10^-6;     //Capacitor
5 Xc=1/(%pi*2*F*C);
6 Bc=1/Xc;
7 I=V/Xc;                          //susceptance  current
8 disp(' Xc  is    = '+string(Xc)+' ohms');
9 disp(' Bc  is    = '+string(Bc)+' siemens');
10 disp(' Current  is    = '+string(I)+' A');
```

Scilab code Exa 2.30 Impedance Admittance Current Power Factor Active power Reacti

```
1                                  //EXAMPLE 2-30      PG NO
                                     -81-82
2 V=230+%i*0;
```

```
F=50;
L=0.03;
R=20;
XL=2*%pi*F*L;
disp('i)  INDUCTANCE (XL) is  in polar form  =  '+
   string (XL) +'  ohm ');
Z=R+%i*XL;
disp('ii)  IMPEDANCE (Z) is  in polar form  =  '+
   string (Z) +'  ohm ');
Y=1/Z;
disp('iii)  ADMITTANCE (Y) is  in polar form  =  '+
   string (Y) +'  siemens ');
I=V/Z;
disp('iv)  CURRENT (I) is in polar form  =  '+
   string (I) +'  A ');
Vr=I*R;
disp('v)  VOLTAGE (Vr) is  in polar form  =  '+
   string (Vr) +'  V ');
VL=%i*XL*I
disp('vi)  VOLTAGE (VL) is  in polar form  =  '+
   string (VL) +'  V ');
Q=25.23;                          //TETA
PF=cos(Q);
disp('vi)  POWER FACTOR (PF) is  =  '+string (PF)
    +' lagging ');
P=V*I*cos(Q);          //ACTIVE POWER
disp('vi)  ACTIVE POWER (P) is  in polar form  =  '
   +string (P) +'  W ');
q=V*I*sin(Q)
disp('vi)  REACTIVE POWER (q) is  in polar form  =
    '+string (q) +'  W ');
S=230*10.4;
disp('vi)  APPARENT POWER (S) is  in polar form  =
    '+string (S) +'  VA ');
```

Scilab code Exa 2.31 Current Apparent Power Active Power

```
1             //EXAMPLE 2-31  PG NO=82
2 Z1=20.15+%i*15.18;
3 Z2=6.99+%i*17.29;
4 Z=Z1+Z2;                    //impedance
5 V=230+%i*0;
6 I=V/Z;                      //Current
7 PF=0.64;                          //Power  Factotr
8 S=V*I;                              //Apparent Power
9 P=S*PF;                               //Active Power
10 disp(' Impedanceis in rectangular form  = '+string(
   Z)+' ohm');
11 disp(' current  is in rectangular form  = '+string(
   I)+' A');
12 disp(' S  is in rectangular form  = '+string(S)+'
   VA');
13 disp(' POWER  is in rectangular form  = '+string(P)
   +' W');
```

Scilab code Exa 2.32 Active Power Current Voltage

```
1   //EXAMPLE 2-32    PG NO-83
2 cos30=0.866;
3 sin30=0.5;
4 E1=141.42+%i*0;
5 E2=144.566+%i*11.976;
6 V=E1+141.42*(cos30 * sin30 );
7 disp('1) Voltage  is in rectangular form  = '+
   string(V)+' W');
8 Z=8+%i*6;           //IMPEDANCE
9 I=V/Z;
10 disp('1) Current is in rectangular form  = '+string
   (I)+' A');
11 P=I*V*0.743;
```

```
12 disp(' POWER  is  in  rectangular  form    = '+string(P)
     +' W');
```

Scilab code Exa 2.33 Impedance Admittance Current Power Factor Apparent Power Acti

```
1                                  //EXAMPLE 2-33      PG NO-84-85
2  V=230+%i*0;                            //Voltage
3  F=50;                                 //Frequency
4  C=10^-4;                               //Capacitor
5  R=10;                                //Resistance
6  XC=1/[2*%pi*F*C];                            //Capacitor
7  disp('i)   CAPACITOR (XC) is  in polar form  =  '+
     string (XC) +'  ohm ');
8  Z=R-%i*XC;                                   //Impedance
9  disp('ii)   IMPEDANCE (Z) is  in polar form  =  '+
     string (Z) +'  ohm ');
10 Y=1/Z;                                     //Admittance
11 disp('iii)  ADMITTANCE (Y) is  in polar form  =  '+
     string (Y) +'  siemens ');
12 I=V/Z;                                      //current
13 disp('iv)   CURRENT (I) is in polar form   =  '+
     string (I) +'  A ');
14 Vr=I*R;                                    // Voltage
15 disp('v)   VOLTAGE (Vr) is  in polar form  =  '+
     string (Vr) +'  V ');
16 VC=%i*XC*I                              //Voltage
17 disp('vi)   VOLTAGE (VL) is  in polar form  =  '+
     string (VC) +'  V ');
```

Scilab code Exa 2.34 Impedance Power Factor Power Consumed

```
1                                  //EXAMPLE 2-34          PG NO
                                     -85
```

```
2 V=80+%i*60;                    //voltage
3 I=-4+%i*10;                  //current
4 Z=V/I;                  //Impedance
5 PF=0.26;                       //power factor
6 P=V*I*PF;               //Power
7 disp(' IMPEDANCE   is in rectangular form = '+string
    (Z)+' ohm');
8 disp(' POWER  is in rectangular form   = '+string(P)
    +' W');
```

Scilab code Exa 2.35 Maximum Charge and Energy

```
1                              //EXAMPLE-2-35          PG
                                 NO-86
2 Vr=100;                      //VOLTAGE
3 P=300;                     //POWER
4 I=P/Vr;                    //CURRENT
5 V=240;                     //voltage
6 F=50;                     //frequency
7 Z=V/I;                       //IMPEDANCE
8 R=Vr/I;
9 Xc=[Z^2-R^2]^0.5;
10 C=1/[2*F*%pi*Xc];           //CAPACITOR
11 Vc=[(V*V)-(Vr*Vr)]^0.5;
12 Vm=sqrt(2)*Vc;
13 Qm=(sqrt(2)*Vc)*(C);                  //CHARGE
14 Em=0.5*[Xc*Vm*Vm];          //MAXIMUM ENERGY
15 disp('i)   CURRENT (I) is    =  '+string (I) +'  A '
    );
16 disp('ii)  IMPEDANCE (Z) is    =  '+string (Z) +'
    ohm ');
17 disp('iii)   RESISTANCE (R) is    =  '+string (R) +'
     ohm ');
18 disp('i)   CAPACITOR (Xc) is    =  '+string (Xc) +'
     ohm ');
```

```
19 disp('i)  CAPACITOR (C) is     =  '+string (C) +'  F
    ');
20 disp('i)   VOLTAGE (Vc) is     =  '+string (Vc) +'  V
    ');
21 disp('i)  MAXIMUM VOLTAGE (Vm) is     =  '+string (Vm
   ) +'  V ');
22 disp('i)  MAXIMUM CHARGE (Qm) is     =  '+string (Qm)
    +'  C ');
23 disp('i)  MAXIMUM ENERGY (Em) is     =  '+string (Em)
    +'  J ');
```

Scilab code Exa 2.36 XL XC Current Power Factor Apparent Power Active Power Reacti

```
1                          //EXAMPLE 2-36     PG NO-87
2 F=50;                   //FREQUENCY
3 L=0.2;                  //INDUCTANCE
4 C=150*10^-6;             //CAPACITOR
5 R=20;
6 V=230;
7 XL=2*%pi*L*F;
8 disp('i)   INDUCTANCE (XL) is     =  '+string (XL) +'
     ohm ');
9 XC=1/(2*%pi*F*C)
10 disp('i)   CAPACITOR (Xc) is     =  '+string (XC) +'
    ohm ');
11 Z=R+%i*(XL-XC)
12 disp('i)   IMPEDANCE (Z) is     in  polar form =  '+
   string (Z) +'  ohm ');
13 I=V/Z;                              //CURRENT
14 disp('i)   CURRENT (I) is in polar form   =  '+
   string (I) +'  ohm ');
15 AP=V*I;                    //APPARENT POWER
16 disp('i)   Apparent Power (AP) is  in polar form  =
    '+string (AP) +'  VA ');
17 P=V*I*0.433;                         //active power
```

```
18 disp('i)  ACTIVE POWER (P) is in polar form = '
     +string (P) +' W ');
19 Q=V*I*0.9013;                    //Reactive Power
20 disp('i)  Reactive Power (Q) is in polar form =
     '+string (Q) +' vars ');
```

Scilab code Exa 2.37 active power impedance

```
1     //EXAMPLE 2-37    PG NO-88
2 Xc=4;
3 XL=6;
4 R=2;                          //RESISTANCE
5 v=8.48+%i*30;;
6 Z=R+%i*(XL-Xc);               //IMPEDANCE
7 V=v;
8 I=V/Z;                       //CURRENT
9 VL=%i*I*XL;
10 Vc=-%i*I*Xc;
11 P=V*I*0.707;                 //ACTIVE POWER
12 disp('i) Active Power = '+string(P)+' W');
13 disp('ii) Impedance = '+string(Z)+' ohm');
14 disp('iii) Current is = '+string(I)+' A');
15 disp('iv) VL is = '+string(VL)+' V');
16 disp('v)Vc is = '+string(Vc)+' V');
```

Scilab code Exa 2.38 Current Voltage

```
1                   //EXAMPLE 2-38      PG N0-88-89
2 Z=12-%i*5;
3 V=100;            //VOLTAGE
4 I=V/Z;            //CURRENT
5 disp('i)  CURRENT (I) is in polar form = '+
    string (I) +' A ');
```

```
Z1=4+%i*3;
Z2=6-%i*8;                                  //impedance
V1=I*Z1;
disp('i)   voltage (V1) is in polar form   =  '+
   string (V1) +'  V ');
V2=I*Z2;                                    //voltage
disp('i)   voltage (V2) is in polar form   =  '+
   string (V2) +'  V ');
V3=2*I;                                     //voltage
disp('i)   voltage (V3) is in polar form   =  '+
   string (V3) +'  V ');
P=V*I*0.9230;                               //ACTIVE POWER
disp('i)   Active Power (P) is in polar form   =  '+
   string (P) +'  W ');
```

Scilab code Exa 2.39 1 Power factor 2 Apparent Reactive Active Power

```
      //EXAMPLE-2-39     PG NO-89
V=7.07;
I=4.24;
W=500;
S=V*I;
cosQ=0.6428;
sinQ=0.766;
P=S*cosQ;                          //ACTIVE POWER
Q=S*sinQ;                         //REACTIVE POWER
Z=V/I;                           //IMPEDANCE
R=Z*cosQ;                       //RESISTANCE
Xc=Z*sinQ;                     //Xc
C=1/(W*Xc);                   //CAPACITOR
P2 =S*(cosQ-1);       //NEGATIVE PEAK  POWER
P3 =S*(cosQ+1);    //POSITIVE PEAK POWER
P1=(P3 +P2)/2;       // POWER
S1=(P3-P1);                        //apparent power
disp(' S is = '+string(S)+' VA');
```

```
19 disp(' ACTIVE POWER  is = '+string(P)+' W');
20 disp(' REACTIVE POWER is = '+string(Q)+' VAr');
21 disp(' IMPEDANCE is = '+string(Z)+' ohm');
22 disp(' RESISTANCE is = '+string(R)+'ohm ');
23 disp(' Xc is = '+string(Xc)+' ohm');
24 disp(' CAPACITOR is = '+string(C)+' F');
25 disp(' POWER CURVE is = '+string(P2)+' W');
26 disp(' POWER CURVE is = '+string(P3)+' W');
27 disp(' POWER  is = '+string(P1)+' W');
28 disp(' S is = '+string(S1)+' VA');
```

Scilab code Exa 2.40 Voltage across v1 v2 Impedance Admittance Power factor

```
1                                   //EXAMPLE 2-40        PG NO
                                      -89-90
2  V1=52.33-%i*34.15878;
3  Z1=7.5-%i*9.999;                  //IMPEDANCE
4  Z2=3.488+%i*12;                   //IMPEDANCE
5  Z3=11.99+%i*5;
6  V2=[Z2/Z1]*V1;
7  disp('i)   voltage (V2) is in polar form   =  '+
      string (V2) +'  V ');
8  V3=[Z3/Z1]*V1;                                  //voltage
9  disp('ii)   voltage (V3) is in polar form   =  '+
      string (V3) +'  V ');
10 V=V1+V2+V3;                                  //total voltage
11 disp('i)   voltage (V) is in polar form   =  '+
      string (V) +'  V ');
12 Z=Z1+Z2+Z3;                                 //Total  Impedance
13 disp('i)   IMPEDANCE (Z) is in polar form   =  '+
      string (Z) +'  V ');
14 Y=1/Z;                                        //Admittance
15 disp('i)   Y (Y) is in polar form   =  '+string (Y)
      +'  ohm ');
```

Scilab code Exa 2.41 Impedance

```
1         //EXAMPLE 2-41    PG NO-90
2 F1=50;                                  //frequency
3 W=(2*%pi*F1);
4 L=1;                                    //inductar
5 C=10^-6;                                  //capacitor
6 XL1=W*L;
7 Xc1=1/(W*C);
8 Z1=XL1-Xc1;
9 F2=1000;
10 XL2=(2*%pi*F2*L);
11 Xc2=1/(2*%pi*F2*C);
12 Z2=(XL2-Xc2);                          //impedance
13 disp(' IMPEDANCE(Z1) is = '+string(Z1)+' ohm');
14 disp(' IMPEDANCE(Z2) is = '+string(Z2)+'ohm');
15 disp(' XL1 is = '+string(XL1)+' ohm');
16 disp(' Xc1 is = '+string(Xc1)+' ohm');
17 disp(' XL2 is = '+string(XL2)+' ohm');
18 disp(' Xc2 is = '+string(Xc2)+' ohm');
```

Scilab code Exa 2.42 Resistance Inductance

```
1   //EXAMPLE 2-42     PG NO-90
2 F=50;                                 //frequency
3 C=100*10^-6;                            //capacitor
4 W=(2*%pi*F);
5 Xc=1/(W*C);
6 R=19.1;                             //resistance
7 XL=25.46;
8 L=XL/(2*%pi*F);                             //inductance
9 disp(' Xc is = '+string(Xc)+' ohms');
```

```
10 disp(' INDUCTANCE is = '+string(L)+' H');
```

Scilab code Exa 2.43 Power Factor

```
1                                    //EXAMPLE 2-43          PG NO
                                       -91
2 R1=6;              //RESISTANCE
3 R2=3;              //RESISTANCE
4 R3=8;              //RESISTANCE
5 Z1=7;                //IMPEDANCE
6 Z2=5;                //IMPEDANCE
7 Z3=10;               //IMPEDANCE
8 V=7;
9 I=1;
10 PF1=R1/Z1;          //POWER FACTOR
11 disp('i)   Power Factor (PF1) is    = '+string (PF1
   ) +'  ');
12 PD1=V*I*0.857;       //POWER dissipated
13 disp('i)   Power Dissipated (PD1) is    = '+string
   (PD1) +' W ');
14 PF2=R2/Z2;
15 disp('iii)   Power Factor (PF2) is    = '+string (
   PF2) +' W ');
16 PD2=Z2*PF2;
17 disp('i)   Power Dissipated (PD2) is    = '+string
   (PD2) +' W ');
18 PF3=R3/Z3;
19 disp('iii)   Power Factor (PF3) is    = '+string (
   PF3) +' W ');
20 PD3=Z3*PF3;
21 disp('i)   Power Dissipated (PD3) is    = '+string
   (PD3) +' W ');
22 A=[Z1^2-R1^2]^0.5;
23 disp('i)   REACTANCE OF COIL (A) is    = '+string (
   A) +'  ohm ');
```

```
24 B=[Z2^2-R2^2]^0.5;
25 disp('i)   REACTANCE OF COIL (B) is     =   '+string (
     B) +'  ohm ');
26 C=[Z3^2-R3^2]^0.5;
27 disp('i)   REACTANCE OF COIL (C) is     =   '+string (
     C) +'  ohm ');
28 TR=R1+R2+R3;
                                                    //
     TOTAL  RESISTANCE
29 disp('i)   TOTAL RESISTANCE (TR) is     =   '+string (
     TR) +'  ohm ');
30 TRC=A+B+C;
                                                     //
     TOTAL RACTANCE
31 disp('i)   TOTAL REACTANCE (TRC) is     =   '+string (
     TRC) +'  ohm ');
32 TI=[TR^2+TRC^2]^0.5;
                                                  //TOTAL
     IMPEADNCE
33 disp('i)   TOTAL IMPEDANCE (TI) is     =   '+string (
     TI) +'  ohm ');
34 PF=TR/TI;
                                                     //
     POWER FACTOR
35 disp('i)   POWER FACTOR (PF) is     =   '+string (PF)
     +'  lagging ');
```

Scilab code Exa 2.44 Resistance Capacitance

```
1                                  //EXAMPLE     2-44        PG
                                     NO 91-92
2 R=20;                              //Resistance
3 V=125;                             //VOLTAGE
4 I=2.2;                              //CURRENT
5 Z=V/I;                              //IMPEDANCE
```

```
disp('i) Impedance is = '+string(Z)+' ');
F=50;                    //FREQUENCY
XC=53.18
C=1/[2*%pi*F*XC];                              //CAPACITANCE
disp('ii) Capacitor is = '+string(C)+' F');
```

Scilab code Exa 2.45 Power Inductance

```
    //EXAMPLE 2-45  PG NO-92
I=10;                          //CURRENT
R=5;                          //RESISTANCE
P=I*I*R;                      //POWER
IL=250;                       //IRON LOSS
Z=20;
r=5;
F=50;
W=2*%pi*F;
p1=750;
v=200;                                 //voltage
L=(Z*Z-r*r)^0.5/W;                       //iductance
cosQ=p1/(v*I);
disp(' power is = '+string(P)+' W')
disp(' inductance is = '+string(L)+' H');
disp(' cos Q is = '+string(cosQ)+' lagging');
```

Scilab code Exa 2.46 P

```
                  //Example  2-46     PG NO-92
Z=50+%i*49.95;                        //IMPEDANCE
V=283;                               //VOLTAGE
T=1;                  //ASSUMING
i=(V/70.675)*[sin(100*%pi-44.97)];
```

```
6 disp('i)   Current (i) is  in polar form  =  '+
    string (i) +'  A');
7 P=(V/sqrt(2))*(4/sqrt(2))*(0.707);
8 disp('ii)   POWER (P) is    =  '+string (P) +'  W ')
    ;
```

Scilab code Exa 2.47 RMS

```
1                                  //EXAMPLE 2-47   PG NO 92
2 V=100/sqrt(2);                        //VOLTAGE
3 F=100;                               //FREQUENCY
4 L=0.018;                             //INDUCTANCE
5 XL=2*%pi*F*L;
6 disp('i)   INDUCTANCE (XL) is  in polar form  =  '+
    string (XL) +'  ohm ');
7 I=V/[(11.3+%i*11.3)];                          //current
8 disp('ii)   CURRENT (I) is  in polar form  =  '+
    string (I) +'  A ');
9 VR=I*10;                                        //voltage
10 disp('i)   Voltage Across Resister (VR) is    =  '+
    string (VR) +'  V ');
```

Scilab code Exa 2.49 current

```
1      //EXAMPLE 2-49   PG NO-93
2 K=0.35;      //CONSTANT
3 L1=0.1;        //INDUCTANCE
4 L2=0.2;      //INDUCTANCE
5 M=K*(L1*L2)^0.5;
6 V=125;         //VOLTAGE
7 F=50;          //FREQUENCY
8 L=0.2;      //  TOTAL INDUCTANCE
9 I=V/(2*%pi*F*L);       //CURRENT
```

```
10 disp(' M is = '+string(M)+' H');
11 disp(' current is = '+string(I)+' A');
```

Scilab code Exa 2.51 Impedance admittance Current Power Factor Apparent Power acti

```
1                    //example 2-51          pg no-94
2 V=230+%i*0;                          //VOLTAGE
3 F=50;                               //FREQUENCY
4 C=10^-4;                           //CAPACITOR
5 R=10;                              //RESISTANCE
6 cos(72.56)=0.299;
7 XC=1/[2*%pi*F*C];
8 disp('i)   INDUCTANCE (XC) is    =  '+string (XC) +'
      ohm ');
9 Z=R-%i*XC;                                 //impedance
10 disp('i)   IMPEDANCE (Z) is  in rectangular form  =
      '+string (Z) +'  ohm ');
11 Y=1/Z;                                   //admittance
12 disp('i)   ADMITTANCE (Y) is  in rectangular form  =
      '+string (Y) +'  ohm ');
13 I=V/Z;                                  //CURRENT
14 disp('i)    CURRENT (I) is  in rectangular form  =
    '+string (I) +'  A ');
15 PF=0.299;            //POWER FACTOR
16 disp('i)   POWER FACTOR (PF) is    =  '+string (PF)
    +'  leading ');
17 S=V*I;                  //APPARENT  POWER
18 disp('i)   APPARENT POWER (S) is  IN rectangular
    FORM  =  '+string (S) +'  VA ');
19 P=V*I*0.3;                     //ACTIVE    POWER
20 disp('i)   ACTIVE POWER (P) is in   rectangular form
       =  '+string (P) +'  W ');
21 Q=V*I*-0.1315;              //REACTIVE POWER
22 disp('i)   REACTIVE POWER (Q) is    in rectangular
    form   =  '+string (Q) +'  vars ');
```

```
23 Vr=I*R;
24 disp('i)   VOLTAGE (Vr) is  in rectangular form  =
     '+string (Vr) +'  V ');
25 Vc=-%i*I*XC;
26 disp('i)   VOLTAGE (Vc) is    =  '+string (Vc) +'  V
     ');
```

Scilab code Exa 2.52 Total Current power Factor

```
1 //   EXAMPLE 2-53     PG  NO-96
2 W=1000;
3 L=0.02;
4 XL=W*L;
5 Z=4.85;
6 V=(100/1.414);
7 I=(20.62/1.414);
8 cos(14.06)=0.97;    //
9 P=V*I*0.97;
10 z=1.18;
11 Leq=z/W;
12 disp(' XL is = '+string(XL)+' ohms');
13 disp(' POWER is = '+string(P)+' W');
14 disp(' Leq is = '+string(Leq)+' H');
```

Scilab code Exa 2.53 Inductance Frequency

```
1                  //EXAMPLE 2-53    PG NO=97
2 R=15;                  //RESISTANCE
3 V=240+%i*0;            //VOLTAGE
4 I=22.1;
5 Ir=V/R;                //CURENT
6 disp('i)  CURRENT (Ir) is    =  '+string (Ir) +'  A
    ');
```

```
IL=[I^2-Ir^2]^0.5;
disp('i)  CURRENT (IL) is     =  '+string (IL) +'  A ');
XL=V/IL;
disp('i)   INDUCTANCE (XL) is     =  '+string (XL) +' ohm ');
L=XL/[2*%pi*50];
disp('i)   INDUCTANCE (L) is     =  '+string (L) +' H ');
IL1=[34^2-Ir^2]^0.5;
disp('i)   INDUCTANCE (IL1) is     =  '+string (IL1) +'  A ');
F=8/[2*%pi*0.05];
disp('i)   FREQUENCY (F) is     =  '+string (F) +' Hz ');
```

Scilab code Exa 2.54 Single Phase AC Circuits

```
    //EXAMPLE 2-54  PG NO-98
C=159*10^-6;      //capacitor
F=50;             //frequency
Xc=1/(2*%pi*F*C);
Z=8.94;                 //impedance
V=100;                  //voltage
I=V/Z;                  //Current
PF=0.894                //power factor
S=V*I;
P=V*I*PF;
Q=V*I*(-0.447);
disp(' CURRENT is = '+string(P)+' A');
disp(' APPARENT POWER is = '+string(S)+' VA');
disp(' active power is = '+string(P)+' W');
disp(' reactive power is = '+string(Q)+' vars');
```

Scilab code Exa 2.55 Resistance

```
1                    //EXAMPLE 2-55      PG NO-99
2
3 Q=72.4;
4 tan(Q)=3.1524;
5 W=3000;
6 C=35*10^-6;
7 Xc=1/[W*C];
8 R=3.1524*Xc
9 disp('i)   CAPACITOR (XC) is     =  '+string (Xc) +'
     ohm ');
10 disp('i)   RESISTANCE (R) is     =  '+string (R) +'
    ohm ');
```

Scilab code Exa 2.56 Current Power Factor

```
1                    //EXAMPLE 2-56      PG NO-99-100
2 V=230+%i*0;
3 R=15+%i*0;
4 L=%i*7.5;
5 Ir=V/R;
6 Z1=-%i*12
7 disp('i)   CURRENT (Ir) is     =  '+string (Ir) +'  A
     ');
8 IL=V/L;
9 disp('i)   INDUCTANCE CURRENT (IL) is     =  '+string
     (IL) +'  A ');
10 Ic=V/Z1;
11 disp('i)   CAPACITOR CURRENT (Ic) is     =  '+string
    (Ic) +'  A ');
12 I=Ir+IL+Ic;
```

```
13 disp('i)    CURRENT (I) is    =  '+string (I) +'  A
    ');
14 Z=V/I;
15 disp('i)   IMPEDANCE (Z) is    =  '+string (Z) +'  A
    ');
16 PF=0.8;
17 Leq=7.2/[2*%pi*50];
18 disp('i)   EQUIVALENT CURRENT (Ieq) is    =  '+
   string (Leq) +'  H ');
```

Scilab code Exa 2.57 Total Current Impedance Admittance Power factor Apparent Powe

```
1                    //EXAMPLE 2-57   PG N0-100-101
2 V=240+%i*0;
3 R=400+%i*0;
4 Z1=%i*50;
5 Z2=-%i*40;
6 IR=V/R;
7 disp('i)   CURRENT (IR) is    =  '+string (IR) +'  A
    ');
8 IL=V/Z1;
9 disp('i)   CURRENT (IL) is    =  '+string (IL) +'  A
    ');
10 IC=V/Z2;
11 disp('i)   CURRENT (IC) is    =  '+string (IC) +'  A
    ');
12 I=IR+IL+IC;
13 disp('i)   CURRENT (I) is    =  '+string (I) +'  A '
   );
14 Z=V/I;
15 disp('i)  IMPEDANCE (Z) is    =  '+string (Z) +'
   ohms ');
16 Y=1/Z;
17 disp('i)  ADMITTANCE (Y) is    =  '+string (Y) +'
   ohm ');
```

```
18 S=V*I;
19 disp('i) APPARENT POWER (S) is = '+string (S) +
    ' VA ');
20 P=V*I*0.448;
21 disp('i) ACTIVE POWER (P) is = '+string (P) +'
    W ');
22 Q=V*I*-0.94;
23 disp('i) REACTIVE POWER (Q) is = '+string (Q) +
    ' vars ');
```

Scilab code Exa 2.58 Voltage Current power Factor Active Reactive Power

```
1                                   //EXAMPLE 2-58      PG NO
                                      -101-102
2 Z1=2+%i*3;
3 Z2=1-%i*5;
4 Z3=4+%i*2;
5 Zeq=[Z2*Z3]/[Z2+Z3];
6 disp('i) IMPEDANCE EQUVALENT (Zeq) is = '+
    string (Zeq) +' ohms ');
7 Z=Z1+Zeq;
8 disp('i) TOTAL IMPEDANCE (Z) is = '+string (Z)
    +' ohm ');
9 V=10;
10 R=5.65+%i*1.588;
11 I=V/R;
12 disp('i) CURRENT (I) is = '+string (I) +' A ')
    ;
13 VBC=I*Zeq;
14 disp('i) VOLTAGE (VBC) is = '+string (VBC) +'
    V ');
15 I2=VBC/Z2;
16 disp('i) CURRENT (I2) is = '+string (I2) +'
    A ');
17 I3=VBC/Z3;
```

```
18 disp('i)  CURRENT   (I3) is  in polar form  =  '+
     string (I3) +'  A ');
19 S=V*I;
20 disp('i)  APPARENT POWER (S) is  in polar form  =  '
     +string (S) +'  VA ');
21 P=V*I*0.963;
22 disp('i)  ACTIVE POWER (P) is  in polar form  =  '+
     string (P) +'  W ');
23 Q=V*I*-0.27;
24 disp('i)  REACTIVE POWER (Q) is  in polar form  =  '
     +string (Q) +'  vars ');
```

Scilab code Exa 2.59 Total Current Shunt Capacitor

```
1     //EXAMPLE 2-59   PG NO-103
2 C1=15.5*10^3;
3 L=1000;
4 V=230;
5 PL1=10;             //active load power
6 PL2=6;             //active load power
7 QL1=7.5;          //reactive load power
8 QL2=8;      //reactiveload power
9 P=PL1+PL2;      //total active power
10 Q=QL1+QL2;       //total reactive power
11 AP=(P*P+Q*Q)^0.5;       //total apparent power
12 I=(AP*L)/V;           //TOTAL CURRENT
13 Ic=(C1/V);
14 Xc=V/Ic;
15 K=16;
16 C=1/(2*%pi*50*Xc);
17 I1=(L*K)/V;
18 disp(' total active power is = '+string(P)+' KW');
19 disp(' total reactive power is = '+string(Q)+'K var
     ');
20 disp(' total apparent power is = '+string(AP)+' KVA'
```

```
    );
21 disp(' total current(I) is = '+string(P)+' A');
22 disp(' Ic is = '+string(P)+' A');
23 disp(' Xc is = '+string(Xc)+' ohm');
24 disp(' capacitor is = '+string(C)+' F');
25 disp(' current(I1) is = '+string(I1)+' A');
```

Scilab code Exa 2.60 Conductance Susceptance Current Power factor

```
1                                   //EXAMPLE 2-60      PG NO-103-104
2  Z1=6+%i*8;
3  V=230;                                 // VOLTAGE
4  Y1=1/Z1;
5  disp('i) ADMITTANCE (Y1) is    =  '+string (Y1) +'
       siemens ');
6  G1=0.06;
7  B1=-0.08;
8  Z2=4-%i*3;
9  Y2=1/Z2;
10 disp('ii) ADMITTANCE (Y2) is    =  '+string (Y2) +'
       siemens ');
11 G2=0.16;
12 B2=0.12;
13 TL=G1+G2;                                //TOTAL CONDUCTANCE
14 disp('iii) TOTAL CONDUCTANCE (TL) is    =  '+string
     (TL) +' siemens');
15 TS=B1+B2;                                  //TOTAL SUSCEPTANCE
16 disp('iv) TOTAL SUSCEPTANCE (TS) is    =  '+string
     (TS) +'  siemens ');
17 I1=V*Y1;                                //   CURRENT
18 disp('v) CURRENT (I1) is    =  '+string (I1) +' A '
     );
19 I2=V*Y2;
20 disp('vi) CURRENT (I2) is    =  '+string (I2) +' A
     ');
```

```
21 TI=I1+I2;                          //TOTAL CURRENT
22 disp('vii) TOTAL CURRENT (TI) is    = '+string (TI
   ) +' A ');
23 PF=cos(degree(10.3));
24 disp('i) POWER FACTOR (PF) is    = '+string (PF) +
   ' leading ');
```

Scilab code Exa 2.61 admittance Impedance Total Current Power Factor Active Power

```
1                          //EXAMPLE 2-61          PG NO
                             -104-105
2 V=100+%i*0;
3 Zab=1.6+%i*7.2;
4 Yab=1/Zab;
5 disp('i) ADMITTANCE (Yab) is in polar form = '+
   string (Yab) +' siemens');
6 Zcd=4+%i*3;
7 Ycd=1/Zcd;
8 disp('i) ADMITTANCE (Ycd) is in polar form  = '+
   string (Ycd) +' siemens ');
9 Zef=6-%i*8;
10 Yef=1/Zef;
11 disp('i) ADMITTANCE (Yef) is in polar form  = '+
   string (Yef) +' siemens ');
12 Ybg=Yef+Ycd;
13 disp('i) ADMITTANCE (Ybg) is in polar form  = '+
   string (Ybg) +' siemens ');
14 Zbg=1/Ybg;
15 disp('i) IMPEDANCE (Zbg) is in polar form  = '+
   string (Zbg) +' ohms ');
16 TZ=1.6+%i*7.2+4.4+%i*0.8;
17 disp('i) TOTAL IMPEDANCE (TZ) is in polar form  =
    '+string (TZ) +' ohms ');
18 TI=V/TZ;
19 disp('i) TOTAL CURRENT (TI) is in polar form  =
```

```
    '+string (TI) +' A ');
20 Icd=TI*[Zef/(Zcd+Zef)]
21 disp('i) CURRENT (Icd) is in polar form = '+
    string (Icd) +' A ');
22 Ief=TI*[Zcd/(Zcd+Zef)];
23 disp('i) CURRENT (Ief) is in polar form = '+
    string (Ief) +' A ');
24 Pab=TI*TI*1.6;
25 disp('i) POWER (Pab) is in polar form = '+
    string (Pab) +' W ');
26 Pcd=Icd*Icd*4;
27 disp('i) POWER (Pcd) is in polar form = '+
    string (Pcd) +' W ');
28 Pef=Ief*Ief*6;
29 disp('i) POWER (Pef) is in polar form = '+
    string (Pef) +' W ');
30 TP=Pab+Pcd+Pef;
31 disp('i) TOTAL POWER (TP) is in polar form = '+
    string (TP) +' W ');
```

Scilab code Exa 2.62 Current impedance Active Power TotalActive Power Power Factor

```
1                    //EXAMPLE 2-62 PG NO
                     -105-106
2  Z1=24+%i*18;
3  Z2=24-%i*10;
4  Z3=2-%i*0.148;
5  R1=24;
6  R2=24;
7  R3=32;
8  R4=16;
9  V=2;
10 v1=128.3;
11 I=2;
12 I3=32+%i*24;
```

```
13 I4=16-%i*30;
14 Z=Z1+Z2;
15 disp('i) IMPEDANCE (Z) is in polar form = '+
     string (Z) +' ohms ');
16 I1=[Z2/(Z1+Z2)]*Z3;
17 disp('i) CURRENT (I1) is in polar form = '+
     string (I1) +' ohms ');
18 I2=[Z1/(Z1+Z2)]*Z3;
19 disp('i) CURRENT (I2) is in polar form = '+
     string (I2) +' ohms ');
20 P1=I1*I1*R1;
21 disp('i) POWER (P1) is in polar form = '+string
     (P1) +' W ');
22 P2=I2*I2*R2;
23 disp('i) POWER (P2) is in polar form = '+string
     (P2) +' W ');
24 P3=V*V*R3;
25 disp('i) POWER (P3) is in polar form = '+string
     (P3) +' W ');
26 P4=V*V*R4;
27 disp('i) POWER (P4) is in polar form = '+string
     (P4) +' W ');
28 P=P1+P2+P3+P4;
29 disp('i) TOTAL POWER (P) is in polar form = '+
     string (P) +' W ');
30 V1=I1*Z1;
31 disp('i) VOLTAGE (V1) is in polar form = '+
     string (V1) +' V ');
32 V2=V1;
33 disp('i) VOLTAGE (V2) is in polar form = '+
     string (V2) +' V ');
34 V3=I3*Z3;
35 disp('i) VOLTAGE (V3) is in polar form = '+
     string (V3) +' V ');
36 V4=I4*Z3;
37 disp('i) VOLTAGE (V4) is in polar form = '+
     string (V4) +' V ');
38 V=V1+V4+V3;
```

```
39 disp('i%) VOLTAGE (V) is in polar form = '+
   string (V) +' V ');
40 S=v1*I;
41 disp('i) Apparent Power (S) is = '+string (S)
   +' VA ');
42 Q=S*0.0726;
43 disp('i) Reactive Power (Q) is = '+string (Q) +
   ' Var ');
```

Scilab code Exa 2.63 Current Power Factor

```
1                                   //EXAMPLE 2-63 PG NO
                                      -106-107
2 Z1=14+%i*48;
3 Z2=30+%i*40;
4 Z3=24+%i*70;
5 V=230+%i*0;
6 Y1=1/Z1;
7 disp('i) ADMITTANCE (Y1) is in polar form = '+
   string (Y1) +' siemens');
8 Y2=1/Z2;
9 disp('ii) ADMITTANCE (Y2) is in polar form = '+
   string (Y2) +' siemens');
10 Y3=1/Z3;
11 disp('iii) ADMITTANCE (Y3) is in polar form = '+
   string (Y3) +' siemens');
12 Y=Y1+Y2+Y3;
13 disp('i) ADMITTANCE (Y) is in polar form = '+
   string (Y) +' siemens');
14 Z13=29.763+%i*21.62;
15 Z14=10-%i*24;
16 X=Z13+Z14;
17 Y=18+%i*80;
18 A=8-%i*6;
19 disp('i) IMPEDANCE (X) is in polar form = '+
```

```
    string (X) +' ohm');
Z=[{X*Y}/{X+Y}]+A;
disp('i) IMPEDANCE (Z) is in polar form = '+
    string (Z) +' ohm');
I=V/Z;
disp('vi) CURRENT (I) is = '+string (I) +' A ')
    ;
S=V*I;
disp('i) Apparent Power (S) is = '+string (S)
    +' VA ');
P=V*I*0.989;
disp('i) Active Power (P) is = '+string (P) +'
    W ');
Q=V*I*0.146;
disp('i) Reactive Power (Q) is = '+string (Q) +
    ' Var ');
```

Scilab code Exa 2.64 Current in branch Total Current

```
ZA=15+%i*15.708;
ZB=20+%i*0;
V=200+%i*0;
IA=V/ZA;
disp('i) CURRENT (IA) is = '+string (IA) +' A '
    );
IB=V/ZB;
disp('ii) CURRENT (IB) is = '+string (IB) +' A
    ');
I=IA+IB;
disp('vi) TOTAL CURRENT (I) is = '+string (I) +'
    A ');
```

Scilab code Exa 2.66 Power

```
1                                   //EXAMPLE 2-66        PG NO
                                      -108
2  I=15;
3  Z1=10+%i*15
4  Z2=6-%i*8;
5  I1=[I*Z2]/(Z1+Z2);
6  disp('ii) CURRENT (I1) is in polar form = '+
      string (I1) +' A ');
7  I2=(I*Z1)/(Z1+Z2);
8  disp('ii) CURRENT (I2) is in polar form = '+
      string (I2) +' A ');
9  P1=8.59^2*10;
10 disp('ii) Power (P1) is in polar form = '+
      string (P1) +' W ');
11 P2=15.49^2*6;
12 disp('ii) Power (P2) is in polar form = '+string
      (P2) +' W ');
```

Scilab code Exa 2.67 Branch Impedance Total Impedance Branch Current Total Current

```
1                                   //EXAMPLE 2-67        PG NO
                                      -108-109
2  Z1=5;
3  V=100+%i*200;
4  I1=16;                           //CURRENT
5  P1=I1*I1*Z1;
6  disp('i) POWER (P1) is = '+string (P1) +' W ');
7  P2=5000-P1;
8  disp('ii) POWER (P2) is = '+string (P2) +' W ')
      ;
9  Q1=-69.02;
10 cos(-69.02)=0.35;
11 Z2=Z1/0.358;
12 disp('iii) IMPEDANCE (Z2) is in polar form = '+
      string (Z2) +' ohms ');
```

```
13 X1=Z2*-0.933;
14 disp('i)  (X1) is  in polar form  =  '+string (X1)
     +'  ohms ');
15 Z3=5-%i*13.04;
16 I1=V/Z3;
17 disp('ii)  CURRENT (I1) is  in polar form  =  '+
     string (I1) +' A ');
18 P3=3720;
19 I2=P3/(223.6*0.8);
20 disp('ii)  CURRENT (I2) is  in polar form  =  '+
     string (I2) +' A ');
21 z2=8.6+%i*6.45;
22 I3=V/z2;
23 disp('ii)  CURRENT (I3) is  in polar form  =  '+
     string (I3) +' A ');
24 I=I1+I3;
25 disp('ii)  CURRENT (I) is  in polar form  =  '+
     string (I) +' A ');
26 Z=V/I;
27 disp('iii)  IMPEDANCE (Z) is  in polar form  =  '+
     string (Z) +'  ohms ')
```

Scilab code Exa 2.68 Total Power

```
1                                          //EXAMPLE 2-68
                                             PG NO-109-110
2 V=100;
3 Y1=0.16+%i*0.12;
4 Y2=-%i*0.15;
5 I1=V*Y1;
6 disp('i)  CURRENT (I1) is  in polar form  =  '+
     string (I1) +' A ');
7 I2=V*Y2;
8 disp('ii)  CURRENT (I2) is  in polar form  =  '+
     string (I2) +' A ');
```

```
9  P=(V*I1*0.8)+(V*I2*0);
10 disp('iii) Power (P) is in polar form = '+string
       (P) +' W ');
11 I=I1+I2;
12 disp('ii) CURRENT (I) is in polar form = '+
       string (I) +' A ');
```

Scilab code Exa 2.69 Line Current Impedance Circuits Phase Angle

```
1                                  //EXAMPLE 2-69    PG NO-110
2  F=50;
3  L=0.6;
4  R=100;
5  XL=(%pi*2*F*L)
6  disp('i) INDUCTANCE (XL) is = '+string (XL) +'
       ohm ');
7  V=230+%i*0;
8  IR=V/R;
9  disp('ii) CURRENT (IR) is in polar form = '+
       string (IR) +' A ');
10 IL=V/(0+%i*XL);
11 disp('iii) CURRENT (IL) is in polar form = '+
       string (IL) +' A ');
12 I=IR+IL;
13 disp('iv) CURRENT (I) is in polar form = '+
       string (I) +' A ');
14 P=V*I*cos(degree(27.9));
15 disp('v) POWER (P) is in polar form = '+string (
       P) +' W ');
16 Z=V/I;
17 disp('vi) IMPEDANCE (Z) is = '+string (Z) +'
       ohm ');
18 LEQ=41.39/(2*%pi*F);
19 disp('ii) INDUCTANCE (LEQ) is = '+string (LEQ)
       +' H ');
```

Scilab code Exa 2.70 Current Impedance

```
1                    //EXAMPLE 2-70        PG NO-110-111
2 ZA=-%i*227.36;                        //IMPEDANCE
3 ZB=-%i*795.77;                                  //IMPEDANCE
4 ZC=500;                                  //IMPEDANCE
5 V=230+%i*0;                             //VOLTAGE
6 IA=V/ZA;                                    //CURRENT
7 disp('i) CURRENT (IA) is in polar form = '+
    string (IA) +' A ');
8 IB=V/ZB;
9 disp('i) CURRENT (IB) is in polar form = '+
    string (IB) +' A ');
10 IC=V/ZC;
11 disp('i) CURRENT (IC) is in polar form = '+
    string (IC) +' A ');
12 I=IA+IB+IC;
13 disp('i) CURRENT (I) is in polar form = '+string
     (I) +' A ');
14 P=V*I*0.334;
15 disp('i) POWER (P) is in polar form = '+string (
    P) +' W ');
16 Z=V/I;
17 disp('vi) IMPEDANCE (Z) is = '+string (Z) +'
    ohm ');
```

Scilab code Exa 2.71 Power Power Factor

```
1                    //EXAMPLE 2-71  PG NO-111
2 V=240;
3 cos (degree(62.74))=0.458;
```

```
4 Pm=V*2*0.458;
5 disp('i) POWER (Pm) is in rectangular form = '+
    string (Pm) +' W ');
6 I=(2*0.458+1.5)-%i*(2*0.89);
7 disp('i) CURRENT (I) is in rectangular form = '+
    string (I) +' A ')
8 P=V*3*0.805
9 disp('i) Power (P) is in rectangular form = '+
    string (P) +' W ')
```

Scilab code Exa 2.72 Power Factor Total volts Active Reactive power Overall Power

```
1   //EXAMPLE 2-72   PG NO 111
2 P.F=0.5;
3 cosQ=0.5;
4 sinQ=0.866;
5 V=552;
6 I=2.3;
7 v=240;
8 PF1=0.89;
9 P=v*I*PF1;
10 Q=(V*V-P*P)^0.5;
11 disp(' ACTIVE POWER is = '+string(P)+' W');
12 disp(' REACTIVE POWER is = '+string(Q)+' vars');
```

Scilab code Exa 2.73 Inductance Capacitance

```
1       //EXAMPLE 2-73   PG NO-112
2 R=44.074;
3 V=230;
4 I=3.05;
5 Z=V/I;
6 Y=2.475;
```

```
X=(Z*Z-R*R)^0.5;
L=X/(2*%pi*50)
Xc=V/Y;
C=1/(2*50*Xc*%pi);
disp(' impedance is = '+string(Z)+' ohm');
disp(' X is = '+string(X)+' W');
disp('inductance  is = '+string(L)+'H ');
disp(' Xc is = '+string(Xc)+' ohm');
disp(' Capacitor is = '+string(C)+' F');
```

Scilab code Exa 2.74 Current in each branch Total Current Power Factor Total appar

```
                    //EXAMPLE 2-74  PG NO-112
ZA=10+%i*7.226;                    //IMPEDANCE
ZB=5+%i*10.99;                    //IMPEDANCE
V=200+%i*0;                        //VOLTAGE
IA=V/ZA;                                //CURRENT
disp('i) CURRENT (IA) is in polar form = '+
   string (IA) +' A ');
IB=V/ZB;
disp('ii) CURRENT (IB) is in polar form = '+
   string (IB) +' A ');
I=IA+IB;
disp('iii) CURRENT (I) is in polar form = '+
   string (I) +' A ');
S=V*I;
disp('i) Apparent Power (S) is = '+string (S)
   +' VA ');
P=V*I*0.63;
disp('i) Active Power (P) is = '+string (P) +'
    W ');
Q=V*I*0.775;
disp('i) Reactive Power (Q) is = '+string (Q) +
    ' Var ');
```

Scilab code Exa 2.75 Current Total Apparent Active Reactive Power Power Factor

```
1                          //EXAMPLE 2-75    PG NO-113
2  V=100+%i*0;
3  R=3+%i*2;
4  I=V/R;
5  disp('i) CURRENT (I) is in polar form = '+string
       (I) +' A ');
6  ZA=10+%i*8;
7  ZB=9-%i*6;
8  ZC=3+%i*2;
9  IB=I*[ZA/(ZA+ZB)];
10 disp('i) CURRENT (IB) is in polar form = '+
      string (IB) +' A ');
11 IA=I*[ZB/(ZA+ZB)];
12 disp('i) CURRENT (IA) is in polar form = '+
      string (IA) +' A ');
13 Z=[(ZA*ZB)/{ZA+ZB}]+ZC;
14 disp('vi) IMPEDANCE (Z) is = '+string (Z) +'
      ohm ');
15 V1=I*Z;
16 disp('vi)VOLTAGE (V1) is = '+string (V1) +' V '
      );
17 S=V1*I;
18 disp('i) Apparent Power (S) is = '+string (S)
      +' VA ');
19 P=V1*I*0.984;
20 disp('i) Active Power (P) is = '+string (P) +'
       W ');
21 Q=[S^2-P^2]^0.5;
22 disp('i) Reactive Power (Q) is = '+string (Q) +
      ' Var ');
```

Scilab code Exa 2.76 magnitude Phase Angle Total Impedance

```
Z1=8+%i*10;
Z2=7+%i*9;
Z3=5-%i*2;
Z={Z1*Z2}/{Z1+Z2};
disp('vi) IMPEDANCE (Z) is in polar form = '+
    string (Z) +' ohm ');
TZ=Z+Z3;
disp('vi) TOTAL IMPEDANCE (TZ) is = '+string (
    TZ) +' ohm ');
```

Scilab code Exa 2.77 Power Factor

```
                                //EXAMPLE 2-77 PG NO
                                    -114
R=sqrt(2.5^2-1.724^2)-0.69;
disp('i) Resistance (R) is = '+string (R) +'
    ohm ');
R1=sqrt(2.5^2-1.92^2)-0.384;
disp('ii) Resistance (R1) is = '+string (R1) +
    ' ohm ');
r=5;
PF=(0.69+R)/2.5;
disp('iii) Power Factor (PF) is = '+string (PF
    ) +' lagging ');
r1=10;
PF1=(0.384+R1)/2.5;
disp('iv) Power Factor (PF1) is = '+string (
    PF1) +' lagging ');
```

Scilab code Exa 2.78 Voltage

```
1                                   //EXAMPLE  2-78  PG NO-114-115
2  I=10;
3  L1=0.0318;                                 //INDUCTANCE
4  L2=0.0191;
5  F=50;                                      //FREQUENCY
6  C=398*10^-6;                               //CAPACITOR
7  XL1=[2*%pi*F*L1];
8  disp('i)  INDUCYANCE (XL1) is  =  '+string (XL1)
       +' ohm ');
9  XL2=[2*%pi*F*L2];
10 disp('ii)  INDUCYANCE (XL2) is  =  '+string (XL2)
       +' ohm ');
11 XC=1/[2*%pi*F*C];
12 disp('iii) CAPACITOR (XC) is  =  '+string (XC) +'
       ohm ');
13 Z1=5+%i*6;
14 Z2=7-%i*8;
15 Z3=8+%i*9.99;
16 Z=[(Z1*Z2)/(Z1+Z2)]+Z3;
17 disp('iv)  IMPEDANCE (Z) is  in polar form  =  '+
       string (Z) +' ohm ');
18 VAB=I*Z;
19 disp('i) VOLTAGE (VAB) is  in polar form  =  '+
       string (VAB) +' V ')
```

Scilab code Exa 2.79 Voltage

```
1                                   //EXAMPLE 2-79
                                      PG NO-115
2  I2=10+%i*0;
```

```
3 Z1=7-%i*8;
4 Z2=5+%i*6
5 V=I2*Z1;
6 disp('i) VOLTAGE (V) is in polar form = '+string
      (V) +' V ');
7 I1=V/Z2;
8 disp('i) CURRENT (I1) is in polar form = '+
     string (I1) +' A ')
9 I=I2-%i*13.44;
10 disp('i) CURRENT (I) is in polar form = '+string
      (I) +' A ')
11 VAB=15.57*18.52;
12 disp('i) VOLTAGE (VAB) is in polar form = '+
     string (VAB) +' V ')
```

Scilab code Exa 2.80 R1 X1 X2

```
1                                          //EXAMPLE 2-80
                                                PG NO
                                              -115-16
2 I=12+%i*0;
3 X2=13.33;
4 R=10+%i*13.33;
5 V=I*R;
6 disp('i) VOLTAGE (V) is in polar form = '+string
      (V) +' V ')
7 V1=30-%i*27.67;
8 Z1=10.6165+%i*1.5;
9 R1=V1/Z1;
10 disp('i) RESISTANCE (R1) is in polar form = '+
     string (R1) +' ohm ')
```

Scilab code Exa 2.81 Current in each branch Total Current Active Reactive Apparent

```
1                                    //EXAMPLE 2-81   PG NO
                                       -116-117
2  Z1=10+%i*10;
3  Z2=20+%i*0;
4  Z3=20-%i*0.2;
5  V=100+%i*0;
6  I1=V/Z1;
7  disp('i) CURRENT (I1) is in polar form = '+
       string (I1) +' A ')
8  I2=V/Z2;
9  disp('i) CURRENT (I2) is in polar form = '+
       string (I2) +' A ')
10 I3=V/Z3;
11 disp('i) CURRENT (I3) is in polar form = '+
       string (I3) +' A ')
12 I=I1+I2+I3;
13 disp('i) CURRENT (I) is in polar form = '+string
       (I) +' A ')
14 S=V*I;
15 disp('i) Apparent Power (S) is in polar form =
       '+string (S) +' VA ');
16 P=V*I*0.95;
17 disp('i) Active Power (P) is in polar form = '+
       string (P) +' W ');
18 Q=[S^2-P^2]^0.5;
19 disp('i) Reactive Power (Q) is in polar form =
       '+string (Q) +' Var ');
```

Scilab code Exa 2.82 Resistance Capacitance

```
1                                    //EXAMPLE 2-82          PG NO-117
2  Z1=4+%i*314.16;                                    //Impedance
3  I1=1/Z1;                                             //CURRENT
4  disp('i) Current (I1) is = '+string (I1) +' A
       ');
```

```
I2=I1+%i*90;                                    //CURRENT
disp('ii)  Current (I2) is  =  '+string (I2) +' A ');
Z2=1/I2;                                        //IMPEDANCE
disp('i)  Impedance (Z2) is  =  '+string (Z2) +' ohm ');
R=310.16;                                       //RESISTANCE
Xc=310.16;
F=50;
C=1/(2*%pi*F*Xc);
disp('i)  Capacitor (C) is  =  '+string (C) +' F ');
```

Scilab code Exa 2.83 Active Reactive Apparent Power

```
                                    //EXAMPLE 2-83  PG NO -117-118
V=125+%i*0;
I1=5+%i*0;
I2=1.2+%i*1.964;
Z2=V/I2;
disp('iv)  IMPEDANCE (Z2) is  in polar form  =  '+string (Z2) +' ohm ');
R=28.26;
XC=46.43;
F=50;
C=1/[2*%pi*F*XC];
disp('iv)  CAPACITOR (C) is  in polar form  =  '+string (C) +' F ');
I=I1+I2;
disp('iv)  CURRENT (I) is  in polar form  =  '+string (I) +' A ');
S=V*I;
disp('i)  Apparent Power (S) is  in polar form  =  '+string (S) +' VA ');
```

```
16 P=S*0.953;
17 disp('i) Active Power (P) is  in polar form  =  '+
     string (P) +' W ');
18 Q=S*0.302;
19 disp('i) Reactive Power (Q) is  in  polar form  =
     '+string (Q) +' Var ');
```

Scilab code Exa 2.84 Frequency

```
1                                  //EXAMPLE 2-84
                                                PG NO
                                     121-122
2 L=0.01;                         //Inductance
3 C=0.04*10^-6;                     //Capacitor
4 Fo=1/[2*%pi*(sqrt(L*C))];
5 disp('i) Resonant Frequency (Fo) is  =  '+string
     (Fo) +' Hz ');
6 Z=50;
7 R=Z;
8 V=100;
9 Io=V/R;
10 disp('ii) Current (Io) is  =  '+string (Io) +' A
     ');
11 Fc=(1/(2*%pi))*[(1/(L*C))-(R^2/(2*L^2))]^0.5;
12 disp('iii) Cutt Frequency (Fc) is  =  '+string (
     Fc) +' Hz ');
13 Z1=50-%i*2.5;
14 Xc=1/[2*%pi*Fc*C];
15 disp('iv) Xc (Xc) is  =  '+string (Xc) +'  ');
16 Vc=[100/Z1]*Xc;
17 disp('v) VOLTAGE (Vc) is  =  '+string (Vc) +' V
     ');
18 FL=1/[(2*%pi)*[(L*C)-[(R^2*C^2)/2]]^0.5];
19 disp('vi) Frequency (FL) is  =  '+string (FL) +'
     Hz ');
```

```
20 Z2=50+%i*2.5;
21 VL=[100/Z2]*(2*%pi*FL*0.1);
22 disp('i)  VOLTAGE (VL) is    =  '+string (VL) +'  V
    ');
```

Scilab code Exa 2.85 Current

```
1     //example 285  pg no-126
2 I1=0.707;
3 I2=0.707;
4 db=20*log10(0.707);
5 disp(' Ration in db is = '+string(db)+' ');
```

Scilab code Exa 2.86 Resonant Frequency Upper Lower Half Frequency Band Width Volt

```
1     //EXAMPLE 2-86 PG NO 126
2 L=0.5;                          //inductance
3 C=40*10^-6;                     //capacitor
4 Wo=1/(L*C)^0.5;
5 R=10;                          //resistance
6 V=100;                        //voltage
7 Fo=Wo/(2*%pi);               //frequency
8 Q=(Wo*L)/R;
9 W2=233.6;                  //frequency
10 W1=213.6;               //frequency
11 B.W=W2-W1;             //Band width
12 Io=V/R;             //current at resonance
13 Io1=0.707*Io;    //current at half power points
14 V1=Q*V;          //voltage aacross inductance at
    resonance
15 disp(' frequency is = '+string(Wo)+' rad/sec');
16 disp(' frequency is = '+string(Fo)+' Hz');
17 disp(' Q is = '+string(Q)+' ');
```

```
18 disp(' BAND WIDTH is = '+string(B.W)+' rad/sec');
19 disp(' current at resonance is = '+string(Io)+' A');
20 disp(' current at half power points is = '+string(
     Io1)+' A');
21 disp('voltage aacross inductance at resonance  is =
     '+string(V1)+' V');
```

Scilab code Exa 2.87 Inductance Q Current voltage

```
1         //EXAMPLE 2-87     PG NO-127
2 Wo=1000;
3 C=20*10^-6;
4 R=2;
5 V=10;
6 L=1/((Wo^2)*C);
7 Q=(Wo*L)/R;
8 I=V/R;
9 Vr=I*R;
10 VL=Q*V;
11 Vc=Q*V;
12 disp(' INDUCTANCE is = '+string(L)+' H');
13 disp(' Q is = '+string(Q)+' ');
14 disp(' CURRENT(I) is = '+string(I)+' A');
15 disp('VOLTAGE ACROSS RESISTANCE is = '+string(Vr)+'
     V');
16 disp('VOLTAGE ACROSS INDUCTANCE is = '+string(VL)+'
     V');
17 disp(' VOLTAGE ACROSS CAPACITANCE is = '+string(Vc)+
     ' V');
```

Scilab code Exa 2.88 Resonant Frequency Rc

```
1         //EXAMPLE 2-88   PG NO-130
```

```
2 L=10^-3;                  //INDUCTANCE
3 C=20*10^-6;              //CAPACITOR
4 Rc=4;                    //CAPACITOR  RESISTANCE
5 RL=6;                   //LOAD RESISTANCE
6 Wo=(1/(L*C)^0.5)*(((RL*RL)-(L/C))/((Rc*Rc)-(L/C)))
     ^0.5;
7 disp(' Wo is = '+string(Wo)+' rad/sec');
```

Scilab code Exa 2.89 Resonant Frequency Q Band Width Out put Voltage

```
1      //example 2-89  pg no-134
2 L=8*10^-3;                      //INDUCTANCE
3 C=16*10^-9;
4 Wo=1/[L*C]^0.5;
5 R=10;                          //RESISTANCE
6 Fo=Wo/(2*%pi);               //FREQUENCY
7 Q=(Wo*L)/R;
8 Rp=((R*R)+(Wo*Wo*L*L))/R
9 Vo1=100;
10 B.W1=Wo/Q;
11 R2=10*10^3;
12 R3=60*10^3;
13 LR=(Rp*R2)/R3;
14 Q1=(Q*LR)/Rp
15 Vo2=16.666;
16 B.W2=Wo/Q1;
17 disp(' Wo is = '+string(Wo)+' rad/sec');
18 disp(' Q is = '+string(Q)+' ');
19 disp(' Rp is = '+string(Rp)+' ohm');
20 disp('BAND WIDTH 1 is = '+string(B.W1)+' rad/sec');
21 disp('Load resistance is = '+string(LR)+' ohm');
22 disp('  Q1 is = '+string (Q1)+' ');
23 disp('BAND WIDTH2is = '+string(B.W2)+' rad/sec');
```

Scilab code Exa 2.90 R L C

```
1     //EX 2-90  PG NO-135
2 R=20;              //RESISTANCE
3 Vc=250;           //VOLTAGE
4 I=1;             //CURRENT
5 F=50;             //FREQUENCY
6 W=2*%pi*F;
7 C=1/(W*50);           //CAPACITOR
8 L=1/(W*W*C);             //INDUTANCE
9 disp('W is = '+string(W)+' ');
10 disp('CAPACITANCE(C) is = '+string(C)+' F');
11 disp('INDUCTANCE(L) is = '+string(L)+' H');
```

Scilab code Exa 2.91 Current at resonance

```
1      //EXAMPLE 2-91  PG NO-135
2 L=10*10^-6;          //INDUCTANCE
3 R=1;             //RESISTANCE
4 C=10^4*10^-12;     //CAPACITOR
5 V=100;              //VOLTAGE
6 Z=L/(C*R);         //IMPEDANCE
7 I=V/Z;             //CURRENT
8 disp('IMPEDANCE is = '+string(Z)+'ohm');
9 disp('CURRENT is = '+string(I)+' A');
```

Scilab code Exa 2.92 frequency

```
1 //EXAMPL2-92  PG NO-136
```

```
2 L=0.5;
3 R=25;
4 C=10^-6;
5 Wo= ((L- (R*R*C))/(5*10^-6*(0.5*0.5)))^0.5;
6 Q=(Wo*L)/R;
7 B.W=Wo/Q;
8 disp('FREQUENCY is = '+string(Wo)+' rad/sec');
9 disp('Q is = '+string(Q)+' ');
10 disp('band width is = '+string(B.W)+'rad/sec');
```

Scilab code Exa 2.93 Self Inductane Mutual Inductance voltage induce

```
1    //EXAMPLE 2-93  PG NO-139
2 N1=100;
3 Q1=0.05*10^-3;
4 I1=5;
5 L1=0.01;
6 L2=0.01;
7 K=0.6;
8 i=1000;      //(di/dt=20/0.02)
9 M=K*((L1*L2)^0.5);
10 V=M*i;
11 disp('mutual induction is = '+string(M)+' H');
12 disp('voltage induce is = '+string(V)+' v');
```

Scilab code Exa 2.94 Mutual Inductance EMF

```
1      //EXAMPLE 2.94     PG NO-139-140
2 L=0.6;    //LENGTH
3 a=20*10^-4;    //AREA
4 MU=(4*%pi*10^-7);
5 R=L/(MU*a);
6 N1=1500;
```

```
7  N2=500;
8  i=250;
9  M=(N1*N2)/R;
10 e=M*(i);
11 disp('R = '+string(R)+' ');
12 disp('mutual induction is = '+string(M)+' H');
13 disp('E.M.F INDUCE is = '+string(e)+' V');
```

Scilab code Exa 2.95 Mutual Inductance

```
1                                   //EXAMPLE 2-95      PG NO
                                      -140
2  L=1.5;                          //INDUCTANCE
3  a=(2000*0.01);
4  R=L/(4*%pi*10^-7*a);                    //RESISTANCE
5  disp('i) Resistance (R) is = '+string (R) +'
      ohm ');
6  N1=30;
7  N2=600;
8  M=(N1*N2)/R;
9  disp('ii) M (M) is = '+string (M) +' H ');
10 e=M*(10/0.01);
11 disp('iii) e (e) is = '+string (e) +' V ');
```

Scilab code Exa 2.96 Mutual Inductance Coefficient Coupling

```
1       //EXAMPLE-2.96    PG NO-140
2  M=0.125;
3  L1=0.2;
4  L2=0.15;
5  K=M/((L1*L2)^0.5)
6  disp('i) K = '+string (K)+' ');
```

Scilab code Exa 2.97 L1 L2 M K

```
1                                          //EXAMPLE-2.97   PG
                                             NO-140
2  N1=500;                 //NUMBER OF TURN
3  N22=1500;
4  N12=500
5  Q1=0.6*10^-3;            //FLUX OF COIL
6  I1=5;                    //CURRENT
7  Q12=0.3*10^-3;
8  L1=(N1*Q1)/I1
9  K=Q12/Q1;
10 L2=(N22/N12)*L1;
11 M=K*((L1*L2)^0.5);
12 disp('i) L1 = '+string (L2)+' ');
13 disp('ii) K = '+string (K)+' H');
14 disp('iii) L2 = '+string (L2)+' H');
15 disp('i) M = '+string (M)+' H ');
```

Scilab code Exa 2.98 L1 L2 M N2

```
1                  //example-2.98    pg no-141
2  L1=37.5*10^-3;
3  M=63.75*10^-3;
4  K=0.85;
5  N1=250;
6  L2=((M/K)^2)/L1;
7  N2=250/((L1/L2)^0.5);
8  disp('i) L2 = '+string (L2)+' ');
9  disp('i) N2 = '+string (N2)+' ');
```

Scilab code Exa 2.99 M K

```
1                                   //EXAMPLE 2-99          PG
                                      NO -141
2 L1=6.8;
3 L2=4.5;
4 C1=19.6;
5 C2=3;
6 M=(C1-C2)/4;
7 disp('i) M (M) is = '+string (M) +' mH ');
8 K=M/sqrt(L1*L2);
9 disp('ii) K (K) is = '+string (K) +' ');
```

Scilab code Exa 2.100 Self Inductance Mutual Inductance Coefficient of coupling

```
1                                   //example 2.100      pg no
                                      -141
2 L1=15;
3 L2=35;
4 M=10;
5 K=M/((L1*L2)^0.5);                //coefficient of
    coupling
6 disp('i) COEFFICENT OF CUPLING (K) = '+string (K)+'
    ')
```

Scilab code Exa 2.102 Equivalent Inductance

```
1                                   //EXAMPLE 2-102          PG
                                      NO-142
```

```
L1=0.3;
L2=0.8;                    //INDUCTANCE
K=0.7;
M=K*sqrt(L1*L2);
disp('i) M (M) is    =  '+string (M) +'  H ');
Lp=[(L1*L2)-M^2]/[L1+L2-(2*M)];
disp('ii)  Lp (Lp) is    =  '+string (Lp) +'  H ');
```

Scilab code Exa 2.103 Equivalent Inductance

```
          //Example 2-103          pg no-142
L1=10;
L2=5;
L3=6;
M12=2;
M23=1;
M13=1;
X=1     //    X=di/dt
V1=(L1*X)+(M12*X)+(M13*X);
V2=(M12*X)+(L2*X)+(M23*X);
V3=(-M13*X)+(-M23*X)+(L3*X);
V=V1+V2+V3;
Ls=L1+L2+L3+(2*M12)-(2*M23)-(2*M13);
disp('i) V1 = '+string (V1)+' ')
disp('ii) V2 = '+string (V2)+' ')
disp('iii) V3 = '+string (V3)+' ')
disp('iv) V = '+string (V)+' ')
disp('v)equivlent indutance (Ls) = '+string (Ls)+'
   mH')
```

Scilab code Exa 2.104 Self Inductance Total Inductance Energy

```
//  Example-2.104    pg no-143
```

```
L=38.5*10^-3;
La=100*10^-3;
Lb=53.8*10^-3;
C=0.3;                          //CAPACITOR
i=3;
M=(C*L);
E1=(0.5*La*(3^2));          //energy in seriesauding
    connection
E2=(0.5*Lb*(i^2));          //ENERGY IN SERIES OPPOSING
    CONNECTION
disp('i) M = '+string (M)+' H')
disp('i) ENERGY aiding = '+string (E1)+' J')
disp('i) ENERGY opposing = '+string (E2)+' J')
```

Scilab code Exa 2.105 Self Inductance Mutual Inductance Turns of coil

```
                              //EXAMPLE-2.105      PG-NO143
N1=250;       //number of  turn
I1=2;        //current
Q1=0.3*10^-3;                 //phi
L1=(N1*Q1)/I1;
V2=63.75;
K=0.85;
x=10^3;       //x=di/dt
M=V2/x;
L2=((V2/K)^2)/((37.510^-3)^0.5);
Q12=0.255*10^-3;
y=1.275*10^-7;      //y=dQ12/dt
N2=V2/y
;
disp('i) L1 = '+string (L1)+' Tesla')
disp('ii) M = '+string (M)+' ')
disp('iii) L2 = '+string (L2)+' ')
disp('iv) N2 = '+string (N2)+'')
```

Scilab code Exa 2.106 Resonant Frequency Current

```
1                                   //EXAMPLE-2.106      PG NO
                                      -144
2  Fo=35.59;          //frequency in HZ
3  V=50;
4  R=100;
5  I=V/R;
6  L=0.5;
7  XL=(2*%pi*Fo*L);
8  V.I=XL*L;      //VOLTAGE ACROSS INDUCTION
9  XC=XL;
10 Q=XC/R;
11 S=L/Q;
12 W2=323.55;         //UPPER HALF REQUENCY
13 W1=123.65;          //LOWER HAL FREQUENCY
14 B.W=W2-W1;         //   BAND WIDTH
15 disp('i) INDUCTION  = '+string (XL)+ ' ohm ');
16 disp('i)VOLTAGE ACROSS INDUCTION   = '+string (V.I)+
       ' V ');
17 disp('i) Q  = '+string (Q)+ ' ');
18 disp('i) REQUENCY  = '+  string   (S)+      ' ohm ');
19 disp('i) BAND WIDTH  = ' +string (B.W)  +  ' rad/sec
     ');
```

Scilab code Exa 2.107 Average Value RMS Value

```
1                                   //EXAMPLE 2-107          PG
                                      NO-145
2  Vm=100;
3  RMS=Vm/{sqrt(3)};
4  disp('i)  RMS (RMS) is    =  '+string (RMS) +' ');
```

```
5 AVG=50;
6 FF=RMS/AVG;
7 disp('ii)    Form Factor (FF) is     =   '+string (FF)
    +'    ');
```

Scilab code Exa 2.108 RMS

```
1       //EXAMPLE 2-108    PG NO-146
2 I1=(100/1.414)^2;
3 I2=(10/1.414)^2;
4 R.M.S=(I1+I2)^0.5;
5 disp('R.M.S VALUE is = '+string(R.M.S)+' A');
```

Scilab code Exa 2.109 Real Power Reactive Power Power Factor

```
1                          //EXAMPLE 2-109              PG NO
                             -146
2 V=200;
3 I=10;
4 W=314;
5 Z=V/I;
6 disp('i)    IMPEDANCE (Z) is     =   '+string (Z) +'
    ohm ');
7 R=Z*0.707;
8 disp('ii)    RESISTANCE (R) is     =   '+string (R) +'
    ohm ');
9 XC=Z*0.707;
10 disp('iv)    INDUCTANCE (XC) is     =   '+string (XC) +'
     ohm ');
11 C=1/(W*XC);
12 disp('iv)    CAPACITOR (C) is     =   '+string (C) +' F
     ');
13 P=V*I*0.707;
```

```
14 disp('i) Active Power (P) is in polar form = '+
     string (P) +' W ');
15 Q=V*I*0.707;
16 disp('i) Reactive Power (Q) is in polar form =
     '+string (Q) +' Var ');
```

Scilab code Exa 2.111 Total Power Factor Total Active and Reactive Power

```
1                                //EXAMPLE 2-111 PG
                                   NO-147
2 VCB=2.49-%i*12.50;
3 R=4+%i*2;
4 I1=VCB/R;
5 disp('i) CURRENT (I1) is in polar form = '+
     string (I1) +' A ');
6 I2=2.5+%i*0;
7 I=I1+I2;
8 disp('i) CURRENT (I) is in polar form = '+string
     (I) +' A ');
9 VAC=11.8-%i*0.12;
10 VCB=2.5-%i*12.5;
11 VAB=VAC+VCB;
12 disp('i) VOLTAGE (VAB) is in polar form = '+
     string (VAB) +' V ')
```

Scilab code Exa 2.112 impedance resistance reactance

```
1                  //EXAMPLE 2-112 PG NO-148
2 I=5;
3 R=25;
4 Z=50;
5 Z1=40;
6 R1=[Z^2-R^2-1600]/50;
```

```
7 disp('i) RESISTANCE (R1) is = '+string (R1) +'
    ohm ')
8 X1=[1600-R1^2]^0.5;
9 disp('ii) INDUCTANCE (X1) is = '+string (X1) +'
    ohm ')
10 Pc=I*I*R1;
11 disp('iii) Power (Pc) is = '+string (Pc) +' W
    ');
12 P=I*I*(R+R1);
13 disp('iv) Power (P) is = '+string (P) +' W ');
```

Scilab code Exa 2.113 Resonant Frequency Dynamic Resistance Band width

```
1 //example -2.113 pg no -149
2 Wo=9.798*10^3;
3 Fo=1559.39;
4 C=2;
5 R=10*10^-6;
6 L=10^-3;
7 D.R=L/(C*R); //DYNAMIC RESISTANCE
8 Q=(1/C)*((L/R)^0.5);
9 B.W=Wo/Q; //BAND WIDTH
10 disp('i) DYNAMIC RESISTANCE = '+string (D.R)+ ' ohm
    ');
11 disp('ii) Q = '+string (Q)+' ');
12 disp('iii) BAND WIDTH = '+string (B.W)+'rad/sec ');
```

Chapter 3

Three Phase Circuits

Scilab code Exa 3.1 Line Current Total Volts Ampere Active Power Reactive Power

```
1                //EXAMPLE 3-1 PG NO-172
2 VL=400;
3 Vp=400/sqrt(3);
4 Z=8-%i*10;
5 IL=Vp/Z;
6 S=sqrt(3)*(VL*IL);
7 P=S*(cos(-51.34));
8 Q=S*(sin(-51.34));
9 Von=230.94+%i*0;
10 Vbn=-115.47-%i*99.99
11 disp('i) RMS   =  '+string (S)+'A ')
```

Scilab code Exa 3.2 Load Impedance Line Voltage

```
1       //EXAMPLE 2-32     PG NO 173
2 Vp=400;      //Peak voltage
3 VL=400;
4 Z=8-%i*10;      //Impedance
```

```
5  Ip=VL/12.81;
6  IL=sqrt(3)*Ip;
7  S=sqrt(3)*VL*IL;
8  P=S*cos(-51.34);
9  Q=S*sin(-51.34);
10 Vab=Vp+%i*0;
11 Vbc=-200-%i*346.410;
12 Vca=-200+%i*346;
13 Iab=Vab/Z;
14 Ibc=Vbc/Z;
15 Ica=Vca/Z;
16 Ia=Iab-Ibc;
17 Ib=Ibc-Iab;
18 Ic=Ica-Ibc;
19 disp('i) Peak current   =  '+string (Ip)+'A ')
20 disp('i) S   =  '+string (S)+'VA ')
21 disp('i) Active Power   =  '+string (P)+'W ')
22 disp('i) Reactive power   =  '+string (Q)+'Vars ')
23 disp('i) Iab is in reactance form  =  '+string (Iab)
     +'A ')
24 disp('i) Ibc is in  reactance form =  '+string (Ibc)
     +'A ')
25 disp('i) Ica is in reactance  form=  '+string (Ica)
     +'A ')
26 disp('i) Ia is in  reactance form =  '+string (Ia)+'
     A ')
27 disp('i) Ib is in reactance form  =  '+string (Ib)+'
     A ')
28 disp('i) Ic is in reactance  =  '+string (Ic)+'A ')
```

Scilab code Exa 3.3 Line Current Active and Reactive Power

```
1       //EXAMPLE 3.3  PG NO 174
2  Zy=3+%i*5.196;
3  Zeq=2.55+%i*2.916;
```

```
4 Vp=230.94;
5 IL=59.61;
6 Ip=59.61;
7 VL=400;
8 cos(48.83)=0.658;
9 sin(48.83)=0.7527;
10 S=sqrt(3)*VL*IL;
11 P=sqrt(3)*VL*IL*0.658;
12 Q=sqrt(3)*VL*IL*0.7527;
13 disp('i) S = '+string (S)+'VA ')
14 disp('i) Active power = '+string (P)+'W ')
15 disp('i) Reactive power = '+string (Q)+'Vars ')
```

Scilab code Exa 3.4 Current

```
1 //EXAMPLE 3-4 PG NO-174
2 V=220;
3 Im=15.75+%i*21;
4 Z=5.33-%i*4;
5 LI=V/(sqrt(3)*Z);
6 TLI=LI+Im;
7 cos(-17.16)=0.955;
8 PF=sqrt(3)*0.955*V*32.42;
9 disp('i) Line current = '+string (LI)+'A ');
10 disp('i) TOTAL line current = '+string (TLI)+'A '
   );
11 disp('i) Power Factor = '+string (PF)+'W ');
```

Scilab code Exa 3.5 line current active and reactive power

```
1 //EXAMPLE 3-5 PG NO-175
2 Pm=6000;
3 Qm=8000;
```

```
4  Z=16-%i*12;
5  V=220;
6  PC=V/Z;
7  PL=3*V*11*0.799;
8  QL=3*V*11*(-0.6);
9  P=Pm+PL;
10 Q=Qm+QL;
11 PF=cos(1/tan(Q/P));
12 IL=P/(sqrt(3)*V*0.9555);
13 disp('i) Phase current   =  '+string (PC)+'A ');
14 disp('i) PL   =  '+string (PL)+'W ');
15 disp('i) QL   =  '+string (QL)+'Vars ');
16 disp('i) Active power   =  '+string (P)+'W ');
17 disp('i) Reactive Power   =  '+string (Q)+'Vars ');
18 disp('i) Power factor   =  '+string (PF)+'lagging ')
     ;
19 disp('i)  line current (IL)  =  '+string (IL)+'A ');
```

Scilab code Exa 3.6 Phase Current Line Current Total Active and Reactive Power

```
1                          //EXAMPLE 3-6      PG NO-175
2  Vac=100+%i*0;
3  Vcb=-50-%i*86.6;
4  Vba=-50+%i*86.6;
5  Zac=6+%i*8;
6  Rcb=20+%i*0;
7  Zba=4-%i*3;
8  Zcb=20+%i*0;
9  Iac=Vac/Zac;
10 disp('i) CURRENT (Iac) is in rectangular form =
     '+string (Iac) +' A ');
11 Icb=Vcb/Zcb;
12 disp('i) CURRENT (Icb) is in rectangular form =
      '+string (Icb) +' A ');
13 Iba=Vba/Zba;
```

```
14 disp('i) CURRENT (IbA) is in rectangular form =
     '+string (Iba) +' A ');
15 Ia=Iac-Iba;
16 disp('i) CURRENT (Ia) is in rectangular form = '
     +string (Ia) +' A ');
17 Ic=Icb-Iac;
18 disp('i) CURRENT (Ic) is in rectangular form = '
     +string (Ic) +' A ');
19 Ib=Iba-Icb;
20 disp('i) CURRENT (Ib) is in rectangular form =
     '+string (Ib) +' A ');
21 Pac=Vac*Iac*0.6;
22 disp('iv) Power (Pac) is in rectangular form =
     '+string (Pac) +' W ');
23 Pcb=Vcb*Icb;
24 disp('iv) Power (Pcb) is in rectangular form =
     '+string (Pcb) +' W ');
25 Pba=Vba*Iba*0.8;
26 disp('iv) Power (Pba) is in rectangular form = '
     +string (Pba) +' W ');
27 Qac=100*20*0.8;
28 disp('iv) Reactive Power (Qac) is in rectangular
     form = '+string (Qac) +' vars ');
29 Qba=100*20*-0.6
30 disp('iv) Reactive Power (Qba) is in rectangular
     form = '+string (Qba) +' vars ');
31 P=600+500+1600;
32 disp('iv) Power (P) is = '+string (P) +' W ');
33 Q=800-1200;
34 disp('iv) Power (Q) is = '+string (Q) +' vars
     ');
```

Scilab code Exa 3.7 line currents

```
1 //EXAMPLE 3-7 PG NO-176-177
```

```
2 Vab=400+%i*0;
3 Vbc=-200-%i*346.410;
4 R=100;
5 Ica=0;
6 Iab=Vab/R;
7 disp('i) CURRENT (Iab) is in rectangular form =
    '+string (Iab) +' A ');
8 Ibc=Vbc/R;
9 disp('i) CURRENT (Ibc) is in rectangular form =
    '+string (Ibc) +' A ');
10 Ia=Iab-Ica;
11 disp('i) CURRENT (Ia) is in rectangular form = '
    +string (Ia) +' A ');
12 Ib=Ibc-Iab;
13 disp('i) CURRENT (Ib) is in rectangular form = '
    +string (Ib) +' A ');
14 Ic=Ica-Ibc;
15 disp('i) CURRENT (Ic) is in rectangular form = '
    +string (Ic) +' A ');
```

Scilab code Exa 3.8 Line Current Neutral Current Total power

```
1                                    //EXAMPLE 3-8    PG NO-177
2 Za=10-%i*8;
3 Zb=12+%i*0;
4 Zc=8+%i*10;
5 Van=230.94+%i*0;
6 Vbn=-115.47-%i*200;
7 Vcn=-115.47+%i*200;
8 Ia=Van/Za;
9 disp('i) CURRENT (Ia) is in rectangular form = '
    +string (Ia) +' A ');
10 Ib=Vbn/Zb;
11 disp('ii) CURRENT (Ib) is in rectangular form =
    '+string (Ib) +' A ');
```

```
12 Ic=Vcn/Zc;
13 disp('iii) CURRENT (Ic) is in rectangular form =
       '+string (Ic) +' A ');
14 In=Ia+Ib+Ic;
15 disp('iv) CURRENT (In) is in rectangular form =
      '+string (In) +' A ');
16
17 P=(230.94*18.028*0.78)+(230.94*19.245)
      +(230.94*18.028*0.62)
18
19 disp('v) POWER (P) is in rectangular form = '+
      string (P) +' W ');
```

Scilab code Exa 3.9 Line Current Neutral Current

```
1                                          //EXAMPLE 3-9
                                                 PG NO
                                               -178-179
2 Z1=10+%i*0;
3 Z2=13+%i*7.5;
4 Z3=-13+%i&7.5;
5 Z4=8.66-%i*5;
6 X=[Z1+Z2 Z3;Z3 Z2+Z4];
7 Z5=-104+%i*180.13;
8 Z6=280+%i*0;
9 Y=[Z5 Z3;Z6 Z2+Z4];
10 I1=det(Y/X);
11 disp('i) Current (I1) is = '+string (I1) +' A
       ');
```

Scilab code Exa 3.10 Voltage Line Currents

```
1  //EXAMPLE 3-10 PG NO -180
2  Za=6+%i*0;
3  Zb=5.26+%i*3;
4  Zc=3.535+%i*3.535;
5  Van=230.94+%i*0;
6  Vcn=-115.47-%i*200;
7  Vbn=-115.47+%i*200;
8  Ya=1/Za;
9  disp('i) admittance (Ya) is in rectangular form =
       '+string (Ya) +' siemens ');
10 Yb=1/Zb;
11 disp('i) admittance (Yb) is in rectangular form
     = '+string (Yb) +' siemens ');
12 Yc=1/Zc;
13 disp('i) admittance (Yc) is in rectangular form =
       '+string (Yc) +' siemens ');
14 Von=[(Van*Ya)+(Vbn*Yb)+(Vcn*Yc)]/(Ya+Yb+Yc);
15 disp('i) Voltage (Von) is in rectangular form =
     '+string (Von) +' V');
16 Vao=Van-Von;
17 disp('i) Voltage (Vao) is in rectangular form =
     '+string (Vao) +' V');
18 Vbo=Vbn-Von;
19 disp('i) Voltage (Vbo) is in rectangular form =
     '+string (Vbo) +' V');
20 Vco=Vcn-Von;
21 disp('i) Voltage (Vco) is in rectangular form =
     '+string (Vco) +' V');
22 Ia=Vao*Ya;
23 disp('i) CURRENT (Ia) is in rectangular form = '
     +string (Ia) +' A ');
24 Ib=Vbo*Yc;
25 disp('i) CURRENT (Ib) is in rectangular form = '
     +string (Ib) +' A ');
26 Ic=Vco*Yc;
27 disp('i) CURRENT (Ic) is in rectangular form = '
     +string (Ic) +' A ');
```

Scilab code Exa 3.11 Reading on wattmeter

```
1                                   //EXAMPLE 3-11    PG NO-181
2
3 Vrn=230.94+%i*0;
4 Vyn=-115.47-%i*200;
5 Vbn=-115.47+%i*200;
6 Yr=-%i*0.05;
7 Yy=%i*0.05;
8 Yb=0.05;
9 Von=[(Vrn*Yr)+(Vyn*Yy)+(Vbn*Yb)]/(Yr+Yy+Yb);
10 disp('i) Voltage (Von) is in rectangular form =
    '+string (Von) +' V');
11 Vyo=Vyn-Von;
12 disp('i) Voltage (Vyo) is in rectangular form =
    '+string (Vyo) +' V');
13 Iy=Vyo*Yy;
14 disp('iii) CURRENT (Iy) is in rectangular form =
    '+string (Iy) +' A ');
```

Scilab code Exa 3.12 Phase Current of delta and star Active Power Power Factor

```
1                   //EXAMPLE 3-12        PG NO-181-182
2 Vp=400;
3 Zp=10+%i*24;
4 Zpy=6-%i*8;
5 Ip=Vp/Zp;
6 disp('i) CURRENT (Ip) is in rectangular form = '
   +string (Ip) +' A ');
7 Ipy=[Vp/sqrt(3)]/Zpy;
8 disp('ii) CURRENT (Ipy) is in rectangular form =
    '+string (Ipy) +' A ');
```

```
Rp=10;
Rpy=6;
Xp=24;
Xpy=-8;
P1=3*Ip*Ip*Rp;
disp('iii) Power (P1) is = '+string (P1) +' W ');
P2=Ipy*Ipy*3*Rpy;
disp('iv) Power (P2) is = '+string (P2) +' W ');
Q1=3*Ip*Ip*Xp;
disp('v) Power (Q1) is = '+string (Q1) +' W ');
Qy=3*Ipy*Ipy*Xpy;
disp('vi) Power (Qy) is = '+string (Qy) +' W ');
P=P1+P2;
disp('vii) Power (P) is = '+string (P) +' W ');
Q=Q1+Qy;
disp('viii) Power (Q) is = '+string (Q) +' W ');
S=P+%i*Q;
disp('ix) Power (S) is = '+string (S) +' W ');
LI=S/[sqrt(3)*Vp];
disp('x) CURRENT (LI) is in rectangular form = '+string (LI) +' A ');
```

Scilab code Exa 3.13 Line voltage

```
//EXAMPLE 3-13 PG NO 182
VRY=375.877+%i*136.80;
disp('i) LINE VOLTAGE (VRY) is in rectangular form = '+string (VRY) +' V ');
```

```
4  VYB=-69.45-%i*393.923;
5  disp('ii)   LINE VOLTAGE (VYB) is in rectangular
     form   =  '+string (VYB) +' V  ');
6  VBR=-306.41+%i*257.11;
7  disp('iii)   LINE VOLTAGE (VBR) is in rectangular
     form   =  '+string (VBR) +' V  ');
8  VYR=-VRY;
9  disp('i)   LINE VOLTAGE (VYR) is in rectangular form
       =  '+string (VYR) +' V  ');
10 VRB=69.45+%i*393.923;
11 disp('i)   LINE VOLTAGE (VRB) is in rectangular form
       =  '+string (VRB) +' V  ');
12 VBY=306.41-%i*257.11;
13 disp('i)   LINE VOLTAGE (VBY) is in rectangular form
       =  '+string (VBY) +' V  ');
```

Scilab code Exa 4.14 Current voltage

```
1                                  //EXAMPLE 3-14   PG NO 182-183
2  X=[400+%i*0 -6+%i*0,-200-%i*346.410  6-%i*0];
3  Y=[12+%i*0 -6+%i*0,-6+%i*0 6-%i*8];
4  I1=52.31-%i*7.120;
5  I2=37.957-%i*14.23;
6  Ia=I1;
7  disp('i) CURRENT  (Ia) is  in rectangular form  =  '
     +string (Ia) +' A ');
8  Ib=I2-I1;
9  disp('i) CURRENT  (Ib) is  in  rectangular form  =
     '+string (Ib) +' A ');
10 IC=-I2;
11 disp('i) CURRENT  (Ic) is  in rectangular form  =  '
     +string (IC) +' A ');
12 Z1=6+%i*0;
13 Vao=Ia*Z1;
14 disp('i) VOLTAGE  (Vao) is  in rectangular form  =
```

```
    '+string (Vao) +' V ');
15 Vbo=Ib*Z1;
16 disp('i) VOLTAGE (Vbo) is in rectangular form =
    '+string (Vbo) +' V ');
17 Vco=IC*(-%i*8);
18 disp('i) VOLTAGE (Vco) is in rectangular form =
    '+string (Vco) +' V ');
```

Scilab code Exa 3.15 Line Current Neutral Currents Reading of wattmeter

```
1                                   //EXAMPLE 3-15 PG NO-185-186
2 Van=230.94+%i*0;
3 Vbn=-115.47-%i*200;
4 Vcn=-115.47+%i*200;
5 V1=10*10^3;
6 Ia=V1/Van;
7 disp('i) CURRENT (Ia) is in rectangular form = '
    +string (Ia) +' A ');
8 V2=4*10^3;
9 Ic=V2/Van;
10 disp('i) CURRENT (Ic) is in rectangular form = '
    +string (Ic) +' A ');
11 V3=6*10^3;
12 Ib=V3/Van;
13 disp('i) CURRENT (Ib) is in rectangular form = '
    +string (Ib) +' A ');
14 In=(Ia+Ib+Ic);
15 disp('i) CURRENT (In) is in rectangular form = '
    +string (In) +' A ');
16 W1=[V1+V2+V3]/2;
17 disp('iv) Power (W1) is in rectangular form = '
    +string (W1) +' W ');
```

Scilab code Exa 3.16 Power and Power factor

```
1          //example-3.16    pg no-186
2 W1=5920;
3 W2=2610;
4 P=8530;
5 tanQ=(1.732*(W2-W1))/(W1+W2);
6 cosQ=0.83;
7 P.F=cosQ;
8 disp('i) tanQ  = '+string (tanQ)+' ');
9 disp('ii) POWER FACTOR  = '+string (P.F)+' ');
```

Scilab code Exa 3.18 Power ouputs

```
1   //Example 3.18       pg no-186-187
2 cosQ=0.8;
3 sinQ=0.6;
4 VL=10000;
5 V=5000*10^3;                  //VOLTAGE
6 P.F=0.9;                     //POWER FACTOR
7 IL=V/(1.732*VL*cosQ) ;
8 I1=IL*cosQ;     //ACTIVE  COMPONENT
9 I2=IL*sinQ;     //REACTIVE  COMPONENT
10 P=1.732*(VL*IL*P.F)
11 disp('i) IL = '+string (IL)+' A');
12 disp('i) ACTIVE COMPONENT = '+string (I1)+' A');
13 disp('i)  REACTIVE COMPONENT = '+string (I2)+' A');
14 disp('i)  P  = '+string (P)+' KW');
```

Scilab code Exa 3.19 Current Power factor Active Reactive Power

```
1  //EXAMPLE 3.19      PG NO-187
2 VL=230;
```

```
3 VP=VL/1.732;
4 IL=13.279;
5 COSQ=0.8;
6 SINQ=0.6;
7 P=(1.732*VL*IL*COSQ)
8 R.P=(1.732*VL*IL*SINQ)
9 VA=(1.732*VL*VP)
10 disp('i) POWER FACTOR = '+string (P)+' W');
11 disp('i) POWER FACTOR = '+string (R.P)+' var');
12 disp('i)TOTAL VA = '+string (VA)+' VA');
```

Scilab code Exa 3.20 Load Impedance

```
1  //Example 3.20   pg no-187
2 Ip=100;   //LINE CURRENT
3 COSQ=0.787;
4 SINQ=0.617;
5 pi=3.14;
6 Vp=1100/1.732;
7 W=(2*pi*50)
8 Z=Vp/Ip;
9 R=Z*COSQ;
10 Xc=Z*SINQ
11 C=1/(W*Xc)
12 disp('i) Z = '+string (Z)+' ohm');
13 disp('ii) R = '+string (R)+' ohm');
14 disp('iii)  Xc = '+string (Xc)+' ohm');
15 disp('iiii)capacitance (C) = '+string (C)+' F');
```

Scilab code Exa 3.21 Line current Volt ampere Active and Reactive Power

```
1    // EXAMPLE 3.21  PG NO-187
2 Ip=20;
```

```
3 IL=(1.732*Ip);
4 VL=400;
5 cos40=0.766;
6 sin40=0.642;
7 VA=(1.732*VL*IL);
8 p=(VA*cos40);
9 q=(VA*sin40);
10 disp('i) VA = '+string (VA)+' VA');
11 disp('ii) P = '+string (p)+' W');
12 disp('iii) Q = '+string (q)+' vars');
```

Scilab code Exa 3.22 Phase Current Line Current Power Factor Active Powerand React

```
1                          //EXAMPLE 3.22  PG NO-188
2 Vp=230;
3 VL=230;
4 Z=8+%i*6;
5 Ip=Vp/Z;
6 disp('i) CURRENT (Ip) is in rectangular form = '
    +string (Ip) +' A ');
```

Scilab code Exa 3.23 impedance

```
1                          //EXAMPLE 3-23      PG NO-188
2 Za=8.66+%i*5;
3 Zc=8.48+%i*8.48;
4 Zb=11.50+%i*9.642;
5 VRn=254+%i*0;
6 VYn=-127.02-%i*220;
7 Vbn=-127.02+%i*220;
8 Yr=1/Za;
9 disp('i) admittance (Ya) is in rectangular form =
      '+string (Yr) +' siemens ');
```

```
10 Yb=1/Zb;
11 disp('i) admittance (Yb) is in rectangular form =
       '+string (Yb) +' siemens ');
12 Yy=1/Zc;
13 disp('i) admittance (Yc) is in rectangular form =
       '+string (Yy) +' siemens ');
14
15 Von=[(VRn*Yr)+(Vbn*Yb)+(VYn*Yy)]/(Yr+Yb+Yy);
16
17 disp('i) Voltage (Von) is in rectangular form =
     '+string (Von) +' V');
```

Scilab code Exa 3.24 Total Power and Power Factor

```
1                          //EXAMPLE 3-24 PG NO-189
2 W1=-1200;
3 W2=3400;
4 P=W1+W2;
5 disp('iv) Power (P) is = '+string (P) +' W ')
     ;
6 X=[sqrt(3)*(W2-W1)]/P;
7 disp('iv) (tan (Q)) is = '+string (X) +' '
     );
```

Scilab code Exa 3.25 Line Current Total Power

```
1                          //EXAMPLE 3-25 PG NO
                             -189
2 Vac=240+%i*0;
3 Vcb=-120-%i*207.84;
4 Vba=-120+%i*207.84;
5 Zac=20+%i*0;
6 Zcb=12.99+%i*7.5;
```

```
Zba=0+%i*25;
Iac=Vac/Zac;
disp('i) CURRENT (Iac) is in rectangular form =
    '+string (Iac) +' A ');
Icb=Vcb/Zcb;
disp('i) CURRENT (Icb) is in rectangular form =
    '+string (Icb) +' A ');
Iba=Vba/Zba;
disp('i) CURRENT (Iba) is in rectangular form =
    '+string (Iba) +' A ');
Ia=Iac-Iba;
disp('i) CURRENT (Ia) is in rectangular form = '
    +string (Ia) +' A ');
Ib=Iba-Icb;
disp('i) CURRENT (Ib) is in rectangular form = '
    +string (Ib) +' A ');
Ic=Icb-Iac;
disp('i) CURRENT (Ic) is in rectangular form = '
    +string (Ic) +' A ');
P=(240*12)+(240*16*0.866)+(240*9.6*0);
disp('iv) Power (P) is = '+string (P) +' W ')
    ;
```

Scilab code Exa 3.26 current Power

```
Vab=200+%i*0;
Vbc=-100-%i*173.20;
Vca=-100+%i*173.20;
Zac=31+%i*59;
Zcb=30-%i*40;
Zba=80+%i*60;
Iab=Vab/Zac;
disp('i) CURRENT (Iac) is in rectangular form =
    '+string (Iab) +' A ');
Ibc=Vbc/Zcb;
```

```
10 disp('i) CURRENT (Icb) is in rectangular form =
     '+string (Ibc) +' A ');
11 Ica=Vca/Zba;
12 disp('i) CURRENT (Iba) is in rectangular form =
     '+string (Ica) +' A ');
13 Ia=Iab-Ica;
14 disp('i) CURRENT (Ia) is in rectangular form = '
     +string (Ia) +' A ');
15 Ib=Ibc-Iab;
16 disp('i) CURRENT (Ib) is in rectangular form = '
     +string (Ib) +' A ');
17 Ic=Ica-Ibc;
18 disp('i) CURRENT (Ic) is in rectangular form = '
     +string (Ic) +' A ');
19 P=(200*3*0.46)+(200*4*0.6)+(200*2*0.8);
20 disp('iv) Power (P) is = '+string (P) +' W ')
     ;
```

Scilab code Exa 3.27 Line Current and Total Power

```
1    //EXAMPLE-3.27    PG NO-190-191
2 Zr=4;
3 Zy=5;
4 VL=400;
5 IL=103.1;
6 Q=36.6    //Q=TETA
7 COSQ=0.8028;
8 P=(1.732*VL*IL*COSQ)
9 disp('i) P = '+string (P)+' W');
```

Scilab code Exa 3.28 Line Current Neutral Current Total power

```
1                    //EXAMPLE 3-28    PG NO-191
```

```
2 Van=230.94+%i*0;
3 Vbn=-115.47-%i*200;
4 Vcn=-115.47+%i*200;
5 Za=12-%i*16;
6 Zb=12+%i*0;
7 Zc=8+%i*6;
8 Ia=Van/Za;
9 disp('i) CURRENT (Ia) is in rectangular form = '
    +string (Ia) +' A ');
10 Ib=Vbn/Zb;
11 disp('i) CURRENT (Ib) is in rectangular form = '
    +string (Ib) +' A ');
12 Ic=Vcn/Zc;
13 disp('i) CURRENT (Ic) is in rectangular form = '
    +string (Ic) +' A ');
14 NI=-(Ia+Ib+Ic);
15 disp('i)NEUTRAL CURRENT (NI) is in rectangular
    form = '+string (NI) +' A ');
16 P=(230.95*11.55*0.6)+(230.95*19.25*1)
    +(230.95*23.095*0.8);
17 disp('iv) Power (P) is = '+string (P) +' W ')
    ;
```

Scilab code Exa 3.29 Line current

```
1 //Example-3.29 PG NO-191-192
2 IL=12.55;
3 V=460;
4 Z=V/(1.732*IL)
5 disp('i) Z = '+string (Z)+' ohm');
```

Scilab code Exa 3.30 R and x

```
1                                   //EXAMPLE 3-30          PG NO-192
2 R=8*0.866;                                        //cos30=0.866
3 disp('i)   Resistance (R) is   =  '+string (R) +'
     ohm  ');
4 X=8*0.5;
5 disp('ii)  X (X) is    =  '+string (X) +' ohm  ');
```

Scilab code Exa 3.31 Voltmeter

```
1    //EXAMPLE -3.31   PG NO -193
2 Zr=3333.33;
3 Vry=200;
4 X=16666.66;
5 Y=346.40;     //Y=(300-j173.2)
6 I=Y/X;
7 R.V=I*Zr;
8 disp('i) I = '+string (I)+'<-29.99 A');
9 disp('ii) READING OF VOLTMETER = '+string (R.V)+'
     <-30 degree V');
```

Scilab code Exa 3.32 Line currents

```
1                   //EXAMPLE 3-32          PG NO-193
2 Vry=400+%i*0;
3 Vyb=-200-%i*346.41;
4 Vbr=-200+%i*346.410;
5 I1=14.74-%i*7.3;
6 I2=2.105-%i*10.94;
7 Ir=I1;
8 disp('i) CURRENT  (Ir) is  in rectangular form  =  '
     +string (Ir) +' A ');
9 Iy=I2-I1;
```

```
10 disp('i) CURRENT (Iy) is in rectangular form = '
   +string (Iy) +' A ');
11 Ib=-I2;
12 disp('i) CURRENT (Ib) is in rectangular form = '
   +string (Ib) +' A ');
13 Pr=16.45*16.45*10;
14 disp('i) Power (Pr) is = '+string (Pr) +' W ');
15 Py=Iy*Iy*20;
16 disp('i) Power (Py) is in rectangular form = '+
   string (Py) +' W ');
17 Pb=11.24*11.24*25;
18 disp('i) Power (Pb) is in rectangular form = '+
   string (Pb) +' W ');
19 Vro=-(Ir*10);
20 disp('i) VOLTAGE (Vro) is in rectangular form =
    '+string (Vro) +' V ');
21 Vrn=200-%i*115.475;
22 disp('i) VOLTAGE (Vrn) is in rectangular form =
    '+string (Vrn) +' V ');
23 Von=Vro+Vrn;
24 disp('i) VOLTAGE (Von) is in rectangular form =
    '+string (Von) +' V ');
```

Scilab code Exa 3.33 Neutral Current

```
1                                //EXAMPLE 3-33      PG NO-194
2 Z1=8-%i*6;
3 Z2=3.6-%i*4.8;
4 In=-(Z1+Z2);
5 disp('i) CURRENT (In) is in rectangular form = '
   +string (In) +' A ');
```

Scilab code Exa 3.34 Line Current Total Voltmetter Active and Reactive Power

```
1                                   //EXAMPLE 3-34        PG NO
                                      -194
2  Vp=230.94;
3  Van=230.94+%i*0;
4  Vbn=-115.47-%i*200;
5  Vcn=-115.47+%i*200;
6  Z=8-%i*10;
7  Ia=Van/Z;
8  disp('i) CURRENT (Ia) is in rectangular form = '
      +string (Ia) +' A ');
9  Ib=Vbn/Z;
10 disp('ii) CURRENT (Ib) is in rectangular form =
      '+string (Ib) +' A ');
11 Ic=Vcn/Z;
12 disp('iii) CURRENT (Ic) is in rectangular form =
      '+string (Ic) +' A ');
13 S=sqrt(3)*400*18.03;
14 disp('iv) APPARENT POWER (S) is = '+string (S)
      +' VA ');
15 P=S*0.62;
16 disp('v) Power (P) is = '+string (P) +' W ');
17 Q=S*-0.8;
18 disp('vi) Power (Q) is = '+string (Q) +' vars
      ');
```

Scilab code Exa 3.35 Total Active Power Toal Reactive Power Voltmetter Line Curren

```
1        //EXAMPLE -3.35        PG NO-195
2  I.P=163.44;       //POWER INPUT
3  T.A.P=253.44;     //TOTAL ACTIVE POWER
4  R.P=122.58;     //REACTIVE POWER INDUCTION MOTOR
5  L=40;       //REACTIVE POWER OF SPECIAL LOAD
6  T.P=R.P+L;     //TOTAL REACTIVE POWER
7  S=301.1;     //P+JQ
8  X=T.A.P/S;      //OVERALL POWRER FACTOR
```

```
IL=S*10^3/(1.732*400)
disp('i)TOTAL REACTIVE POWER    =  '+string (T.P)+'
   Kvar')
disp('i) S    =  '+string (S)+' KVA')
disp('i)OVERALL POWER FACTOR (x)    =  '+string (X)+'
    lagging')
disp('iiii)LOAD CURRENT (IL)    =  '+string (IL)+' A'
   )
```

Scilab code Exa 3.36 Phase current Total line current

```
 //EXAMPLE-3.36      PG NO -195
Vp=400/(3)^0.5;
R.p=162.58*10^3;
Ipc=R.p/(3*Vp);
IL=365.82;
Xc=Vp/Ipc;
pi=3.14;
C=1/(2*pi*50*Xc)
disp('i) Ipc = '+string (Ipc)+' A');
disp('ii) Xc = '+string (Xc)+' ohm');
disp('i) CAPACITANCE = '+string (C)+' F');
```

Scilab code Exa 3.37 current

```
                                    //EXAMPLE 3-37
                                      PG NO-196-197
Vry=450+%i*0;
Vyb=-225-%i*389.711;
Vbr=-225+%i*389.711;
Vrn=225-%i*130;
Vyn=-225-%i*130;
Vbn=0+%i*259.8;
```

```
Z1=10.60+%i*10.60;
Z2=5+%i*8.66;
Z3=2.6+%i*1.5;
Z4=12.21+%i*4.44;
Iry=Vry/Z1;
disp('i) CURRENT (Iry) is in rectangular form =
   '+string (Iry) +' A ');
Iyb=Vyb/Z2;
disp('i) CURRENT (Iyb) is in rectangular form =
   '+string (Iyb) +' A ');
Ibr=Vbr/Z3;
disp('i) CURRENT (Ibr) is in rectangular form =
   '+string (Ibr) +' A ');
I1=Iry-Ibr;
disp('i) CURRENT (I1) is in rectangular form = '
   +string (I1) +' A ');
I2=Iyb-Iry;
disp('i) CURRENT (I2) is in rectangular form = '
   +string (I2) +' A ');
I3=Ibr-Iyb;
disp('i) CURRENT (I3) is in rectangular form = '
   +string (I3) +' A ');
I4=Vrn/Z4;
disp('i) CURRENT (I4) is in rectangular form = '
   +string (I4) +' A ');
I5=Vyn/Z4;
disp('i) CURRENT (I5) is in rectangular form = '
   +string (I5) +' A ');
I6=Vbn/Z4;
disp('i) CURRENT (I6) is in rectangular form = '
   +string (I6) +' A ');
I7=Vbn/(3+%i*4);
disp('i) CURRENT (I7) is in rectangular form = '
   +string (I7) +' A ');
IR=I1+I4;
disp('i) CURRENT (IR) is in rectangular form = '
   +string (IR) +' A ');
IY=I1+I4;
```

```
35 disp('i) CURRENT (IY) is in rectangular form = '
     +string (IY) +' A ');
36 IB=I3+I6+I7;
37 disp('i) CURRENT (IB) is in rectangular form = '
     +string (IB) +' A ');
38 IN=-(I7);
39 disp('i) CURRENT (IN) is in rectangular form = '
     +string (IN) +' A ');
```

Scilab code Exa 3.39 Voltage

```
1  VAB=400+%i*0;
2  VBC=-200-%i*346.41;
3  VCA=400+%i*0;
4  Z1=300-%i*398;
5  IAB=VAB/Z1;
6  disp('i) CURRENT (IAB) is in rectangular form =
     '+string (IAB) +' A ');
7  VAD=IAB*300;
8  disp('ii) VOLTAGE (VAD) is in rectangular form =
     '+string (VAD) +' V ');
9  VDA=-VAD;
10 disp('iii) VOLTAGE (VDA) is in rectangular form =
     '+string (VDA) +' V ');
11 VDC=VDA-VCA;
12 disp('iv) VOLTAGE (VDC) is in rectangular form =
     '+string (VDC) +' VA ');
13 VAC=400+%i*0;
14 VCB=-200-%i*346.41;
15 VBA=-200+%i*346.410;
16 IAB1=-(VAC)/Z1;
17 disp('v) CURRENT (IAB1) is in rectangular form =
     '+string (IAB1) +' A ');
18 VAD1=IAB1*300;
19 disp('vi) VOLTAGE (VAD1) is in rectangular form =
```

```
      '+string (VAD1) +' V ');
20 VDA=-VAD;
21 disp('vii) VOLTAGE (VAAD) is in rectangular form
     = '+string (VDA) +' V ');
22 VDC=VDA+VAC;
23 disp('viii) VOLTAGE (VDC) is in rectangular form
     = '+string (VDC) +' V ');
```

Scilab code Exa 3.40 W1 and W2

```
1       //EXAMPLE-3.40     PG NO-199
2  Vry=200;
3  Vbr=200;
4  Vbn=115.47;
5  I1=10;    //10-j12
6  W1=200*I1;
7  X1=173.2;
8  X2=26.66;
9  W2=X1*X2;
10 disp('i)WATTMETERS (W2)    =   '+string (W2)+' W')
```

Scilab code Exa 3.41 Current

```
1        //    CHAPTER -3 EXAMPLE NO 3.41    PG NO-200
2  Vp=230.94;
3  Xa=100+%i*155;
4  Ia=Vp/Xa;
5  COSQ=0.542;
6  P=COSQ;
7  disp('i) (Ia)    =   '+string (Ia)+' A')
```

Scilab code Exa 3.42 Za Zb Zc

```
Van=254+%i*0;
Vbn=-127.02-%i*220;
Vcn=-127.02+%i*220;
Ib=0-%i*10;
Ic=0+%i*20;
Ia=-(Ib+Ic);
disp('i) CURRENT (Ia) is in rectangular form = '
   +string (Ia) +' A ');
Von=-173.20+%i*100;
Vao=Van-Von;
disp('i) VOLTAGE (Vao) is in rectangular form =
   '+string (Vao) +' V ');
Vbo=Vbn-Von;
disp('i) VOLTAGE (Vbo) is in rectangular form =
   '+string (Vbo) +' V ');
Vco=Vcn-Von;
disp('i) VOLTAGE (Vco) is in rectangular form =
   '+string (Vco) +' V ');
Za=Vao/Ia;
disp('i) IMPEDANCE (Za) is in rectangular form =
    '+string (Za) +' ohm ');
Zb=Vbo/Ib;
disp('i) IMPEDANCE (Zb) is in rectangular form =
    '+string (Zb) +' ohm ');
Zc=Vco/Ic;
disp('i) IMPEDANCE (Zc) is in rectangular form =
    '+string (Zc) +' ohm ');
```

Scilab code Exa 3.43 Total Apparent active Reactive Power line Current Power facto

```
    //example-3.43    pg no-200-201
Ip=11<36.87;
PL=5808;
```

```
4  QL=4356;
5  Pm=6000;
6  Qm=8000;
7  P=PL+Pm;
8  Q=Qm-QL;
9  S=((P*P)+(Q*Q))^0.5;
10 X=P/S;      //POWER FACTOR
11 disp('i)ACTIVE POWER (P)    =  '+string (P)+' W')
12 disp('i)REACTIVE POWER (Q)   =  '+string (Q)+' vars(
       inductive)')
13 disp('i)APPARENT POWER (S)   =  '+string (S)+' A')
14 disp('i)power factor (X)     =  '+string (X)+' lagging
       ')
```

Scilab code Exa 3.44 Power and Power Factor

```
1  //EXAMPLE 3.44 PG NO-201
2  W1=800;
3  W2=-400;
4  P=W1+W2;
5  x=(1.723*(W2-W1))/(W1+W2)    //tanQ=x
6  Q=-79.10;
7  y=0.189;
8  P=y     //POWER FACTOR
9  disp('i)tanQ (x)    =  '+string (x)+' ')
10 disp('i) POWER factor (P)    =  '+string (P)+' ')
```

Scilab code Exa 3.45 Line Current

```
1                          //EXAMPLE 3-45    PG NO-201-202
2  Vab=0+%i*212;
3  Vbc=-183.6-%i*106;
4  Vca=183.6-%i*106;
```

```
Za=10+%i*0;
Zb=10+%i*10;
Zc=0-%i*20;
Zab=[(Za*Zb)+(Zb*Zc)+(Za*Zc)]/Zc;
disp('i) IMPEDANCE (Zab) is in rectangular form =
    '+string (Zab) +' ohm ');
Zbc=[(Za*Zb)+(Zb*Zc)+(Za*Zc)]/Za;
disp('i) IMPEDANCE (Zbc) is in rectangular form =
    '+string (Zbc) +' ohm ');
Zca=[(Za*Zb)+(Zb*Zc)+(Za*Zc)]/Zb;
disp('i) IMPEDANCE (Zca) is in rectangular form =
    '+string (Zca) +' ohm ');
Iab=Vab/Zab;
disp('i) CURRENT (Iab) is in rectangular form =
   '+string (Iab) +' A ');
Ibc=Vbc/Zbc;
disp('i) CURRENT (Ibc) is in rectangular form =
   '+string (Ibc) +' A ');
Ica=Vca/Zca;
disp('i) CURRENT (Ica) is in rectangular form =
   '+string (Ica) +' A ');
Ia=Iab-Ica;
disp('i) CURRENT (Ia) is in rectangular form = '
   +string (Ia) +' A ');
Ib=Ibc-Iab;
disp('i) CURRENT (Ib) is in rectangular form = '
   +string (Ib) +' A ');
Ic=Ica-Ibc;
disp('i) CURRENT (Ic) is in rectangular form = '
   +string (Ic) +' A ');
```

Scilab code Exa 3.47 total votamperes Active and Reactive Power

```
1 //EXAMPLE 3-47 PG NO
    -202-203
```

```
2 Vab=212;
3 Vbc=212;
4 Vca=212;
5 Iab=10;
6 Ibc=5;
7 Ica=7.07;
8 P=[(Vab*Iab*0.707)+(Vbc*Ibc*0.707)+(212*7.07*0)];
9 disp('i) ACTIVE POWER (P) is = '+string (P) +' W
    ');
10 Q=[(Vab*Iab*0.707)+(Vbc*Ibc*-0.707)+(212*7.07*-1)]
11 disp('ii)REACTIVE POWER (Q) is = '+string (Q) +'
    vars ');
12 S=[P^2+(Q^2)]^0.5;
13 disp('i) APPARENT POWER (S) is = '+string (S) +
    ' VA ');
```

Scilab code Exa 3.48 voltage

```
1                    //EXAMPLE 3-48   PG NO-202-203
2 Vao=186.7-%i*87.06;
3 Vco=-38.5+%i*292.48;
4 Vbo=-(Vao+Vco);
5 disp('i) VOLTAGE (Vbo) is in rectangular form =
    '+string (Vbo) +' V ');
6 Vab=Vao-Vbo;
7 disp('i) VOLTAGE (Vab) is in rectangular form =
    '+string (Vab) +' V ');
8 Van=201-%i*37.51;
9 Von=Van-Vao;
10 disp('i) VOLTAGE (Von) is in rectangular form =
    '+string (Von) +' V ');
```

Scilab code Exa 3.49 Phase Current Line Current Total active and reactive Power W1

```
1                                    //EXAMPLE 3-49 PG NO-203-204
2  Vab=400+%i*0;
3  Vbc=-200-%i*346.41;
4  Vca=-200+%i*346.410;
5  Z1=%i*10;
6  Z2=-%i*20;
7  Z3=10;
8  Iab=Vab/Z1;
9  disp('i) CURRENT (Iab) is in rectangular form =
       '+string (Iab) +' A ');
10 Ibc=Vbc/Z2;
11 disp('ii) CURRENT (Ibc) is in rectangular form =
       '+string (Ibc) +' A ');
12 Ica=Vca/Z3;
13 disp('iii) CURRENT (Ica) is in rectangular form =
       '+string (Ica) +' A ');
14 Ia=Iab-Ica;
15 disp('iv) CURRENT (Ia) is in rectangular form =
       '+string (Ia) +' A ');
16 Ib=Ibc-Iab;
17 disp('v) CURRENT (Ib) is in rectangular form = '
       +string (Ib) +' A ');
18 Ic=Ica-Ibc;
19 disp('vi) CURRENT (Ic) is in rectangular form =
       '+string (Ic) +' A ');
20 P=Ica*Z3;
21 disp('vii)ACTIVE POWER (P) is in rectangular form
       = '+string (P) +' W ');
22 Q=(Iab^2*Z3)-(Ibc^2*20);
23 disp('viii) REACTIVE POWER (Q) is in rectangular
       form = '+string (Q) +' vars ');
24 S=[P^2+Q^2]^0.5;
25 disp('i)APPARENT POWER (S) is in rectangular form
       = '+string (S) +' VA ');
```

Scilab code Exa 3.50 Line current

```
1                                   //EXAMPLE 3-50        PG NO-204
2 I1=13.12-%i*9.15;
3 I2=-6.80-%i*19.55;
4 IaA=I1;
5 disp('i) CURRENT (IaA) is in rectangular form =
     '+string (IaA) +' A ');
6 IbB=I2-I1;
7 disp('i) CURRENT (IbB) is in rectangular form =
     '+string (IbB) +' A ');
8 IcC=-I2;
9 disp('i) CURRENT (IcC) is in rectangular form =
     '+string (IcC) +' A ');
```

Scilab code Exa 3.51 Resistance reactance Power Factor

```
1                                   //EXAMPLE 3-51        PG NO
                                      -205
2 R1=1.5;
3 X=2.396;
4 X1=sqrt(X^2-R1^2);
5 disp('i) X1 is = '+string (X1) +'ohm ');
6 IL=100;
7 Ip=IL/1.732;
8 disp('ii) Peak Current = '+string (Ip) +' A ');
9 R2=4.5;
10 Z=7.1878;
11 X2=sqrt(Z^2-R2^2)
12 disp('iii) X2 is = '+string (X2) +'ohm ');
13 PF=R2/(Z);
14 disp('vi) Power Factor is = '+string (PF) +' ')
     ;
```

Scilab code Exa 3.52 Line Current Power factor Active and Reactive Power

```
1                                   //EXAMPLE 3-52    PG NO-205-206
2  Vp=230.94;
3  R=20+%i*30;
4  V=400;
5  IL=Vp/R;
6  disp('i) CURRENT (IL) is in rectangular form = '
     +string (IL) +' A ');
7  PF=0.555;
8  P=sqrt(3)*V*IL*PF;
9  disp('ii)ACTIVE POWER (P) is in rectangular form
     = '+string (P) +' W ');
10 Q=sqrt(3)*V*IL*56.289;
11 disp('iii) REACTIVE POWER (Q) is in rectangular
     form = '+string (Q) +' vars ');
12 S=sqrt(3)*V*IL;
13 disp('iv)APPARENT POWER (S) is in rectangular form
      = '+string (S) +' VA ');
14 Ip=3.698;
15 Z=V/Ip;
16 disp('i) IMPEDANCE (Z) is in rectangular form =
     '+string (Z) +' ohm ');
17 R1=Z*0.555;
18 disp('i) RESISTANCE (R1) is in rectangular form =
      '+string (R1) +' ohm ');
19 Xc=Z*0.83;
20 disp('i) INDUCTANCE (Xc) is in rectangular form =
      '+string (Xc) +' ohm ');
21 C=Xc/(2*%pi*50);
22 disp('i) CAPACITOR (C) is in rectangular form =
     '+string (C) +' F ');
```

Scilab code Exa 3.53 Current Active and Reactive Power

```
1                          //EXAMPLE 3-53        PG NO-206-207
2 HP=2000;
3 Vp=2200;
4 E=0.93;
5 MI=(HP*735.5)/E;
6 disp('i) MOTOR INPUT (MI) is in rectangular form
    = '+string (MI) +' W ');
7 Ip=MI/[3*Vp*0.85];
8 disp('i) CURRENT (Ip) is in rectangular form = '
    +string (Ip) +' A ');
9 AC=Ip*0.85;
10 disp('i) ACTIVE CURRENT (AC) is in rectangular
    form = '+string (AC) +' A ');
11 RC=(Ip^2-AC^2)^0.5;
12 disp('i) REACTIVE CURRENT (RC) is in rectangular
    form = '+string (RC) +' A ');
13 LC=sqrt(3)*Ip;
14 disp('i) LINE CURRENT (LC) is in rectangular form
    = '+string (LC) +' A ');
15 ALC=LC*0.85;
16 disp('i)ACTIVE LINE CURRENT (ALC) is in
    rectangular form = '+string (ALC) +' A ');
17 RLC=(LC^2-ALC^2)^0.5;
18 disp('i) REACTIVE LINE CURRENT (RLC) is in
    rectangular form = '+string (RLC) +' A ');
```

Scilab code Exa 3.54 Voltage load impedance

```
1                          //EXAMPLE 3-54  PG NO
                             -207-208
```

```
Van=161.66+%i*0;
Vbn=-80.83-%i*140;
Vcn=-80.83+%i*140;
Z1=10+%i*0;
Z2=8.66+%i*5;
Z3=8.66-%i*5;
YA=1/Z1;
disp('i) ADMITTANCE (YA) is in rectangular form =
    '+string (YA) +' siemens ');
YB=1/Z2;
disp('ii) ADMITTANCE (YB) is in rectangular form
   = '+string (YB) +' siemens ');
YC=1/Z3;
disp('iii) ADMITTANCE (YC) is in rectangular form
    = '+string (YC) +' siemens ');
Von=-[(Van*YA)+(Vbn*YB)+(Vcn*YC)]/[YA+YB+YC];
disp('iv) VOLTAGE (Von) is in rectangular form =
    '+string (Von) +' V ');
Vao=Van-Von;
disp('v) VOLTAGE (Vao) is in rectangular form =
   '+string (Vao) +' V ');
Vbo=Vbn-Von;
disp('vi) VOLTAGE (Vbo) is in rectangular form =
    '+string (Vbo) +' V ');
Vco=Vcn-Von;
disp('vii) VOLTAGE (Vco) is in rectangular form =
    '+string (Vco) +' V ');
```

Scilab code Exa 3.55 Phase and Line Current

```
//EXAMPLE 3-55
  PG NO-208-209
Vab=400+%i*0;
Vbc=-220-%i*381.05;
Vca=-220+%i*381.05;
```

```
Z1=0+%i*25;
Z2=13+%i*7.5;
Z3=20+%i*0;
IAB=Vab/Z1;
disp('i) CURRENT (IAB) is in rectangular form =
    '+string (IAB) +' A ');
IBC=Vbc/Z2;
disp('i) CURRENT (IBC) is in rectangular form =
    '+string (IBC) +' A ');
ICA=Vca/Z3;
disp('i) CURRENT (ICA) is in rectangular form =
   '+string (ICA) +' A ');
IA=IAB-ICA;
disp('i) CURRENT (IA) is in rectangular form = '
   +string (IA) +' A ');
IB=IBC-IAB;
disp('i) CURRENT (IB) is in rectangular form = '
   +string (IB) +' A ');
IC=ICA-IBC;
disp('i) CURRENT (IC) is in rectangular form = '
   +string (IC) +' A ');
```

Scilab code Exa 3.59 current

```
        //EXAMPLE 3-59 PG NO 267
V2=240-%i*14.35;
V1=240+%i*0;
VL=233.73-%i*8.938;
R1=0.6+%i*0.8;
R2=0.5+%i*0.866;
I1=(V1-VL)/R1;
I2=(V2-VL)/R2;
R3=16+%i*12;
I3=(VL/R3);
disp('i) current(I1) is in polar form = '+string (
```

```
    I1)+'A ');
12 disp('i) current(I2) is in polar form = '+string (
    I2)+'A ');
13 disp('i) current(I3) is in polar form = '+string (
    I3)+'A ');
```

Chapter 4

network theorem

Scilab code Exa 4.4 Numbers of trees

```
1                          //EXAMPLE 4-4          PG NO-224
2 A=[1 1 0 0 0 1;0 -1 1 -1 0 0;-1 0 -1 0 -1 0];
3 A1=[1 0 -1;1 -1 0;0 1 -1;0 -1 0;0 0 -1;1 0 0];
4 det(A*A1)=A*A1;
5 disp('i) Numbers of trees ([A*A^T]) is = '+
    string (det(A*A1)) +'  ');
```

Scilab code Exa 4.6 Currents

```
1                  //  EXAMPLE 4-6              PG NO-228
2 I1=-2.59*10^-3;
3 I2=-1.45*10^-3;
4 IR1=I1;
5 disp('i) CURRENT (IR1) is      from A to B = '+
    string (IR1) +' A ');
6 IR2=I2;
7 disp('ii) CURRENT (IR2) is      from B to E = '+
    string (IR2) +' A ');
```

```
IR3=I1-I2;
disp('iii) CURRENT (IR1) is from B to C = '+
    string (IR3) +' A ');
IR4=I1;
disp('vi) CURRENT (IR4) is from C to F = '+
    string (IR4) +' A ');
IR5=I2;
disp('v) CURRENT (IR1) is from D to C = '+
    string (IR5) +' A ');
```

Scilab code Exa 4.8 currents

```
//EXAMPLE 4-8 PG NO-230-231
V=25;
Vm=0.64;
Vn=3.05;
R1=5;
R2=9.64
I1=(V-R2)/R1
disp('i) CURRENT (I1) is = '+string (I1) +' A ');
I2=R2/4;
disp('ii) CURRENT (I2) is = '+string (I2) +' A ');
I3=(R2-Vn)/10;
disp('iii) CURRENT (I3) is = '+string (I3) +' A ');
I4=(10-Vn)/8;
disp('vi) CURRENT (I4) is = '+string (I4) +' A ');
I5=Vn/2;
disp('v) CURRENT (I5) is = '+string (I5) +' A ');
```

Scilab code Exa 4.9 current

```
1                          //EXAMPLE 4-9        PG NO-232-233
2 X=[40 -8 -20;-8 18 -6;-20 -6 36];
3 Y=[24 -8 -20;0 18 -6;0 -6 36];
4 Z=[40 24 -20;-8 0 -6;-20 0 36];
5 U=[40 -8 24;-8 18 0;-20 -6 0]
6 I1=det(Y/X);
7 disp('CURRENT = '+string((I1))+' A');
8 I2=det(Z/X);
9 disp(' CURRENT = '+string(I2)+' A');
10 I3=det(U/X);
11 disp(' CURRENT is = '+string(I3)+' A');
12 IR3=I2;
13 disp(' CURRENT is = '+string(IR3)+' A');
14 IR4=0;
15 disp(' CURRENT is = '+string(IR4)+' A');
16 IR5=I1-I3;
17 disp(' CURRENT is = '+string(IR5)+' A');
18 IR6=I3;
19 disp(' CURRENT is = '+string(IR6)+' A');
```

Scilab code Exa 4.10 Current

```
1                                          //EXAMPLE 4-11        PG
                                               NO-233-234
2 I1=-1.28;
3 I2=-0.83;
4 I3=0.84;
5 IR1=-I1;                                          //CURRENT
     THROUGH 2.2 RESISTANCE
```

```
disp('i) Current (IR1) is = '+string (IR1) +'
    A from B to A ');
IR2=-I1+I2; //CURRENT
   THROUGH 4.7 RESISTANCE
disp('ii) Current (IR2) is = '+string (IR2) +
    ' A from C to B ');
IR3=-I2+I3; //CURRENT
   THROUGH 6.8 RESISTANCE
disp('iii) Current (IR3) is = '+string (IR3)
   +' A from C to D ');
```

Scilab code Exa 4.12 current

```
                    //Example 4-12 PG NO234-235
VA=60.866;
VB=19.13;
R=60;
I60=(VA-VB)/R;
disp(' CURRENT is = '+string(I60)+' A');
```

Scilab code Exa 4.13 current

```
                                //Example 4-13
                                PG NO-235
X=[1 -0.5  2;-0.5 3.5 -4;-0.5 -1 0];
X1=[2 -0.5 -0.5;-4   3.5 -1;0 -1 2.5 ]
X2=[1 -0.5 -0.5;-0.5 3.5 -1;-0.5 -1 2.5];
V=det([X1-X]/X2);                       //V=VA-VC
disp('i) VOLTAGE (V) is = '+string (V) +' V '
   );
I2=0.5*1.566;
disp('i) Current (I2) is = '+string (I2) +' A
       ');
```

Scilab code Exa 5.13 Current

```
1                //EXAMPLE 5-13  PG NO-305
2 Z1=10+%i*0;
3 Z2=-%i*5;
4 Z3=3+%i*4;
5 Z4=3-%i*4;
6 Z5=10+%i*2.5;
7 VTH=(Z1*Z2)/(Z3+Z2);
8 ZTH=2+((20-%i*15)/(3-%i*1));
9 ZL=VTH/(ZTH+Z5);
10 disp('i) VOLTAGE (VTH) is  =  '+string (VTH)+'V ');
11 disp('i) IMPEDANCE (ZTH) is  =  '+string (ZTH)+'ohm
       ');
12 disp('i) IMPEDANCE (ZL) is  =  '+string (ZL)+'A ');
```

Scilab code Exa 4.14 current

```
1                    //EXAMPLE 4-14  PG NO-236
2 VA=61.38;
3 R1=60;
4 R2=110;
5 R3=25;
6 V1=120;
7 V2=40;
8 V3=60;
9 I120=(V1-VA)/R1;
10 disp(' CURRENT is = '+string(I120)+' A');
11 I40=(VA+V2)/R2;
12 disp(' CURRENT is = '+string(I40)+' A');
13 I60=(VA-V3)/R3;
14 disp(' CURRENT is = '+string(I60)+' A');
```

Scilab code Exa 4.16 current

```
1                          //EXAMPLE 4-16          PG NO
                             -236-237;
2 VA=1.96;
3 VB=3.2;
4 IBA=(VB-VA)/2;
5 disp(' CURRENT is = '+string(IBA)+' A');
```

Scilab code Exa 4.17 voltage

```
1                        //EXAMPLE 4-17      PG NO-237
2 A=8.08;                                  //POTENTIAL
3 B=7.942;                                 //POTENTIAL
4 VAB=A-B;                               //POTENTIAL DIFFERENCE
5 disp(' POTENTIAL DIFFERENCE is = '+string(VAB)+' V')
    ;
```

Scilab code Exa 4.19 currents

```
1                                        //EXAMPLE 4-19
                                           PG NO-236
2 i1=11.06;
3 i2=5.34;
4 i3=1.907;
5 IPR=i2-i3;
6 disp(' CURRENT is = '+string(IPR)+' A');
7 IRS=i2;
8 VRS=IRS*10^-3*15*10^3;
```

```
9 disp(' VOLTAGE is = '+string(VRS)+' A');
```

Scilab code Exa 4.21 current and power

```
1                                   //EXAMPLE 4-21                PG NO
                                      -239
2 I1=4.46;
3 I2=9.46;
4 I3=10;
5 I4=6.22;
6 V1=110.8;
7 IAB=I1
8 disp(' CURRENT is = '+string(IAB)+' A');
9 ICD=I2;
10 disp(' CURRENT is = '+string(ICD)+' A');
11 IFE=I3-I1;
12 disp(' CURRENT is = '+string(IFE)+' A');
13 IDE=I2-I4;
14 disp(' CURRENT is = '+string(IDE)+' A');
15 IHG=I4;
16 disp(' CURRENT is = '+string(IHG)+' A');
17 I5=5*V1
18 disp(' CURRENT is = '+string(I5)+' A');
```

Scilab code Exa 4.22 voltage

```
1                                   //EXAMPLE 4-22                PG
                                      NO-39-240
2 R1=50;
3 R2=20;
4 R3=10;
5 V1=50;
6 V2=100;
```

```
7 V=[(V1/R1)+(V2/R2)]/[(1/50)+(1/20)+(1/10)];
8 disp(' Voltage is = '+string(V)+' V');
```

Scilab code Exa 4.23 current

```
1                                //EXAMPLE 4-23          PG NO-240
2 I1=-3/19;
3 V=12.632;
4 I6=I1+1;
5 disp(' CURRENT is = '+string(I6)+' A');
```

Scilab code Exa 4.24 Current

```
1                                  //EXAMPLE 4-24        PG NO
                                     -240-241
2 I1=9;
3 I2=2.5;
4 I3=2;
5 IR3=I2-I3;
6 disp(' CURRENT is = '+string(IR3)+' A');
7 V=13.5;
8 disp(' VOLTAGE is = '+string(V)+' V');
```

Scilab code Exa 4.25 Current

```
1                                      //EXAMPLE 4-25          PG
                                         NO-241
2     //31-15I1-(I1-I2)+10V1=0
3     //-10V1-(I2-I1)-4I2=0;
4     //V1=31-5I1;
```

```
5 I1=5;
6 disp('i) Current (I1)    is      =  '+string (I1) +' A
        ');
7 I2=-11;
8 disp('ii) Current (I2)    is      =  '+string (I2) +'
    A    ');
```

Scilab code Exa 4.28 Current

```
1                                    //EXAMPLE 4-28
                                       PG  NO-243
2 I1=1.42;
3 I2=1.683;
4 I3=0.325;
5 Iba=I2-I1;
6 disp(' CURRENT is = '+string(Iba)+' A');
7 Ibd=I1-I3;
8 disp(' CURRENT is = '+string(Ibd)+' A');
9 Iac=I2;
10 disp(' CURRENT is = '+string(Iac)+' A');
11 Icd=I3;
12 disp(' CURRENT is = '+string(Icd)+' A');
```

Scilab code Exa 4.29 Power

```
1                          //EXAMPLE 4-29                PG
                             NO-243
2 I1=2;                                    //CURRENT
3 R=3;                                     //RESISTANCE
4 P=I1*I1*R;                                 //POWER
5 disp(' POWER is = '+string(P)+' W');
```

Scilab code Exa 4.30 Current

```
1                                   //EXAMPLE 4-30                PG NO
                                      -244
2 I3=-0.882;
3 I=-I3;
4 disp(' CURRENT is = '+string(I)+' A');
```

Scilab code Exa 4.32 Branch Current

```
1                                          //EXAMPLE 4-32
                                             PG NO-245-246
2 Vb=4.55;
3 Vc=2.57;
4 Vd=3.165;
5 Iab=2*(-Vb+9);
6 disp(' CURRENT is = '+string(Iab)+' A');
7 Ida=2*Vd;
8 disp(' CURRENT is = '+string(Ida)+' A');
9 Ibc=Vb-Vc;
10 disp(' CURRENT is = '+string(Ibc)+' A');
11 Idc=Vd-Vc;
12 disp(' CURRENT is = '+string(Idc)+' A');
13 Ibd=5*(Vb-Vd);
14 disp(' CURRENT is = '+string(Ibd)+' A');
15 Ica=Vc;
16 disp(' CURRENT is = '+string(Ica)+' A');
```

Scilab code Exa 4.36 Current

```
1                                   //EXAMPLE 4-36                PG
                                      NO-250-251
2  I1=0.3;
3  I2=-1.1;
4  V1=2*I1;
5  disp(' VOLTAGE is = '+string(V1)+' V');
6  V2=2*I2;
7  disp(' VOLTAGE is = '+string(V2)+' V');
8  V3=-5;
9  disp(' VOLTAGE is = '+string(V3)+' A');
10 V4=-(2*I1)+4;
11 disp(' VOLTAGE is = '+string(V4)+' V');
12 V5=2.8;
13 IAB=V4/2;
14 disp(' CURRENT is = '+string(IAB)+' A');
15 IAD=V5/2;
16 disp(' CURRENT is = '+string(IAD)+' A');
17 IAC=-V3/2;
18 disp(' CURRENT is = '+string(IAC)+' A');
19 IDB=V1/2;
20 disp(' CURRENT is = '+string(IDB)+' A');
21 IDC=-V2/2;
22 disp(' CURRENT is = '+string(IDC)+' A');
23 I=IAB+IAD+IAC-2;
24 disp(' CURRENT is = '+string(I)+' A');
```

Scilab code Exa 4.37 Current

```
1                                   //EXAMPLE 4-37                PG
                                      NO-251-252
2  I1=5;
3  I2=2;
4  I3=1;
5  IAB=I1;
6  disp(' CURRENT is = '+string(IAB)+' A');
```

```
IBE=I1-I2;
disp(' CURRENT is = '+string(IBE)+' A');
IBC=I2;
disp(' CURRENT is = '+string(IBC)+' A');
ICE=I2+I3;
disp(' CURRENT is = '+string(ICE)+' A');
IDC=I3;
disp(' CURRENT is = '+string(IDC)+' A');
```

Scilab code Exa 4.38 Current

```
//EXAMPLE 4-38
PG NO
-252-253
VB=15;
VC=6;
V=20;
IAB=(V-VB)/1;
disp(' CURRENT is = '+string(IAB)+' A');
IBE=VB/IAB;
disp(' CURRENT is = '+string(IBE)+' A');
IBC=(VB-VC)/4.5;
disp(' CURRENT is = '+string(IBC)+' A');
ICE=VC/2;
disp(' CURRENT is = '+string(ICE)+' A');
IDC=1;
disp(' CURRENT is = '+string(IDC)+' A');
```

Scilab code Exa 4.41 Voltage And Current

```
//EXAMPLE-4-41
PG NO-254
I2=0.5;
```

```
3 I3=1.5;
4 R=11/3;
5 V=I3*R;
6 disp(' VOLTAGE is = '+string(V)+' V');
7 R1=20/9;
8 Req=(R*R1)/(R+R1);
9 disp(' RESISTANCE is = '+string(Req)+' ohm');
10 I=V/Req;
11 disp(' CURRENT is = '+string(I)+' A');
```

Scilab code Exa 4.43 Node Voltage

```
1 //EXAMPLE 4-43 PG NO -256-257
2 X=[3 -1 -2;6 -1 -2;6 -5 -16];
3 disp('i) Ditermenent X is = '+string (det(X)) +' ');
4 X1=[0 -1 -2;80 -1 -2;40 -5 -16];
5 V1=X1/X;
6 disp('ii) Ditermenent V1 is = '+string (det(V1)) +' V ');
7 X2=[3 0 -2;6 80 -2;6 40 -16];
8 V3=X2/X;
9 disp('iii) Ditermenent V3 is = '+string (det(V3)) +' V ');
10 X3=[3 -1 0;6 -1 80;6 -5 40];
11 V4=X3/X;
12 disp('iv) Ditermenent V4 is = '+string (det(V4)) +' V ');
```

Scilab code Exa 4.44 Current

```
1                                   //EXAMPLE 4-44
                                                    PG NO 257
2                                       //6I1+14I2=20      I1-I2=-6
3 I1=-3.2;
4 I2=2.8;
5 disp('i) Current(I1)    is      =  '+string (I1) +' A
    ');
6 disp('Ii) Current (I2)    is      =  '+string (I2) +'
    A ');
```

Scilab code Exa 4.46 Current

```
1                                   //EXAMPLE 4-46              PG NO
                                      -258-259
2 X1=[10 -104-%i*200;0 205+%i*150];
3 X2=[200+%i*200 -104-%i*200;-104-%i*200 205+%i*150];
4 I1=det(X1/X2);
5 disp(' Current is  in polar form= '+string(I1)+' A')
    ;
6 X3=[200+%i*200 10;-104-%i*200 0];
7 X4=[200+%i*200 -104-%i*200;-104-%i*200 205+%i*150];
8 I2=det(X3/X4);
9 disp(' Current is in polar form = '+string(I2)+' A')
    ;
10 V=10;                                          //VOLTAGE
11 P=V*5.1*10^-2;                                  //POWERE
12 disp(' POWER is = '+string(P)+' W');
```

Scilab code Exa 4.47 V2

```
1                                       //EXAMPLE 4-47    PG
                                          NO259-260
2 I2=0;
```

```
3 x=%i*1500;
4 y=30+%i*30;
5 V2=x/y;                                    //VOLTAGE
6 disp(' VOLTAGE is  in polar form = '+string(V2)+' V'
    );
```

Scilab code Exa 4.48 Voltage

```
1                                    //EXAMPLE 4-48          PG NO
                                       -260
2 Vm=63.43+%i*33.38;
3 V=100+%i*0;
4 V1=0+%i*50
5 R1=5+%i*0;
6 R2=8+%i*6;
7 R3=12+%i*16;
8 I1=(V-Vm)/R1;
9 disp('i) Current (I1)  is  = '+string (I1) +' A
    ');
10 I2=(V1-Vm)/R2;
11 disp('ii) Current (I2)  is  = '+string (I2) +'
    A ');
12 I3=(Vm)/R3;
13 disp('iii) Current (I3)  is  = '+string (I3) +'
    A ');
```

Scilab code Exa 4.49 Node Voltage

```
1                                    //EXAMPLE 4-49
                                       PG NO
                                     260-261
2 Vm=[10 -0.25;%i*25  0.75+%i*0.5]/[0.45-%i*0.5
    -0.25;-0.25 0.75+%i*0.5];
```

```
3 disp('i) Voltage (Vm) is = '+string (det(Vm))
    +' V ');
4 Vn=[0.45-%i*0.5 10;-0.25 0.75+%i*0.5]/[0.45-%i*0.5
    10;-0.25 0.75+%i*0.5];
5 disp('ii) Voltage (Vn) is = '+string (det(Vn)
    ) +' V ');
```

Scilab code Exa 4.50 Voltage Vcd

```
1 //EXAMPLE 4-50 PG NO
    261-262
2 I1=(17.32+%i*10)/(10+%i*10);
3 VCA=I1*5;
4 disp('i) VOLTAGE (VCA) is = '+string (VCA) +'
    V ');
5 I2=(35.35-%i*35.35)/(5-%i*5);
6 VBD=(-I2)*5;
7 disp('ii) VOLTAGE (VBD) is = '+string (VBD) +
    ' V ');
8 VCD=VCA+VBD;
9 disp('ii) VOLTAGE (VCD) is = '+string (VCD) +
    ' V ');
```

Scilab code Exa 4.51 Current

```
1 //EXAMPLE 4-51 PG
    NO-262
2 X1=[14+%i*6 -%i*10 20+%i*0;-%i*10 24+%i*6 -8.66+%i
    *5;-%i*10 -(4-%i*4) 0];
3 X2=[14+%i*6 -%i*10 -%i*10;-%i*10 24+%i*6 -(4-%i*4)
    ;-%i*10 -(4-%i*4) (34-%i*4)]
4 I3=det(X1/X2);
```

```
5 disp('i) Current (I3)    is      =  '+string (I3) +' A
      ');
```

Scilab code Exa 4.52 Voltage

```
1                                          //EXAMPLE 4-52
                                             PG NO-263
2 X=[(6+%i*2)  (100+%i*0);(-6-%i*3.32)   0];
3 X1=[(6+%i*2) (-6-%i*3.32); (-6-%i*3.32)  (16+%i*12)
    ];
4 I2=det(X/X1);
5 disp('i) Current (I2)    is      =  '+string (I2) +' A
      ');
6 V=10*I2;
7 disp('ii) VOLTAGE (V)    is      =  '+string (V) +' V
     ');
```

Scilab code Exa 4.56 Input Impedance

```
1                              //EXAMPLE 4-56     PG NO-265
2 I1=5.92-%i*4.833;
3 V=12+%i*0;
4 Z=V/I1;
5 disp('i) Input Impedance (Z)    is      =  '+string (Z
    ) +' ohm    ');
```

Scilab code Exa 4.57 Primary and Secondry Current and voltage

```
1                                                  //EXAMPLE 4-57
                                                        PG
                                                     N 265-266
```

```
2 Z1=[200 +%i*4;0 5+%i*10];
3 Z2=[2+%i*5 %i*4;%i*4 5+%i*10];
4 I1=det(Z1/Z2);
5 disp('i) Current (I1)    is      =  '+string (I1) +' A
      ');
6 Z3=[2+%i*5 %i*4;%i*4 5+%i*10];
7 Z4=[2+%i*5 %i*4;%i*4 5+%i*10];
8 I2=det(Z3/Z4);
9 disp('ii) Current (I2)    is      =  '+string (I2) +'
   A   ');
```

Scilab code Exa 4.58 current

```
1
2 // Example : 4.58
3
4 v1=233.73-%i*8.934;
5 vs=240+%i*0;
6 r1=0.6+%i*0.8;
7 i1=(vs-v1)/r1;
8 disp('the value of I1 is = '+string(i1)+' Amp');
9 r2=0.5+%i*0.866;
10 vs1=239.5-%i*14.359;
11 i2=(vs1-v1)/r2;
12 disp('the value of I1 is = '+string(i2)+' Amp');
13 r3=16+%i*12;
14 il=i1/r3;
15 disp('the value of I1 is = '+string(il)+' Amp');
```

Scilab code Exa 4.62 I1 I2 Active and Reactive Power

```
1                    //EXAMPLE 4-61      PG NO
                       -267-268
```

```
2 I1=0.05-%i*6.49;
3 I2=0.040+%i*0.02;
4 R1=100;
5 R2=4+%i*200;
6 Vab=(R1*I2)-[R2*(I1-I2)];
7 disp('i) VOLTAGE (Vab) is = '+string (Vab) +' V
    ');
```

Chapter 5

Network Theorem

Scilab code Exa 5.1 Current

```
1       //EXAMPLE 5-1   PG NO-294
2  TR1=32;
3  R1=20;
4  R2=30;
5  R3=20;
6  V=32;
7  Ir11=V/TR1;
8  Ir12=Ir11*(R1/(R1+R2));
9  Ir13=Ir11*(R2/(R1+R3));
10 TR2=40;
11 I#r2=R3/TR2;
12 I#r1=(R3/TR2)*I#r2;
13 I#r3=(R3/TR2)*I#r1;
14 Ir3=Ir13+I#r3;
15 Ir1=Ir11-I#r1;
16 Ir2=Ir12-I#r2;
17 disp('i) current(Ir3) is    =  '+string (Ir3)+'A ');
18 Ir3=Ir13+I#r3;
19 disp('i) current(Ir1) is   =  '+string (Ir1)+'A ');
20 Ir1=Ir11-I#r1;
21 disp('i) current(Ir2) is    =  '+string (Ir2)+'A ');
```

```
22 Ir2=0.5-0.4;
```

Scilab code Exa 5.2 Voltage

```
1      //EXAMPLE 5-2 PG NO-295
2 Vab1=7.059;
3 Vab2=2.353;
4 Vab=Vab1+Vab2;
5 disp('i) Votage(Vab) is    =   '+string (Vab)+'V ');
```

Scilab code Exa 5.3 Current

```
1       //EXAMPLE 5-3 PG NO-296
2 TR1=(90/14);                          //TOTAL RESISTANCE
3 R1=8;
4 R2=6;
5 R3=3;
6 E1=10;                                //VOLTS
7 IR11=E1*(1/TR1);                                  //
     Current in resistance one
8 IR12=IR11*(R1/(R1+R2));               //Current in
     resistance Two
9 IR13=IR11*(R2/(R1+R2));              //Current in
     resistance one
10 IR14=0;
11 TR2=10;                            //TOTAL RESISTANCE
12 IR23=TR2/E1;
13 IR21=IR23*(R2/(R2+R3));
14 IR22=IR23*(R3/(R2+R3));
15 IR24=0;
16 IR34=(10/12);
17 IR32=TR2/(R2+(R3*R1/11));
18 IR31=IR32*(R1/(R1+R3));
```

```
19 IR33=IR32*(R3/(R1+R3));
20 IR1=(14-6-8)/9;
21 IR2=(8+3-11)/9;
22 IR3=(6+3)/9-1;
23 IR4=IR34+0+0;
24 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR11)+'V ');
25 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR12)+'V ');
26 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR13)+'V ');
27 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR14)+'V ');
28 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR21)+'V ');
29 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR22)+'V ');
30 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR23)+'V ');
31 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR24)+'V ');
32 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR31)+'V ');
33 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR32)+'V ');
34 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR33)+'V ');
35 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR34)+'V ');
36 disp('i) CURRENT IN RESISTANCE ONE is   =  '+string
      (IR1)+'V ');
37 disp('i) CURRENT IN RESISTANCE TWO is   =  '+string
      (IR2)+'V ');
38 disp('i)CURRENT IN RESISTANCE THREE  is   =  '+
      string (IR3)+'V ');
39 disp('i) CURRENT IN RESISTANCE FOUR is   =  '+string
       (IR4)+'');
```

Scilab code Exa 5.4 Current

```
1
2 E1=100+%i*0;
3 E2=43.30+%i*25
4 Z1=1+%i*3;
5 Z2=1-%i*3;
6 Z3=2+%i*4;
7 Z4=3-%i*3
8 Z5=1+%i*5;
9 Z6=2-%i*8;
10 Iab1=E1/((Z1+Z2)+((Z3*Z4)/(Z3+Z4)));
11 I2=E2/((Z5-Z6)+((Z3*Z1+Z2)/(Z3+Z1+Z2)));
12 Iab2=(I2*Z3)/(Z3+Z1+Z2)
13 disp('i) CURRENT (Iab1) is = '+string (Iab1)+'A '
   );
14 disp('i) CURRENT (I2) is = '+string (I2)+'A ');
15 disp('i) CURRENT (Iab2) is = '+string (Iab2)+'A '
   );
```

Scilab code Exa 5.6 Current

```
1                    //EXAMPLE 5-6 PG NO=299-300
2 TZ1=54.90+%i*85;
3 Z1=40+%i*0;
4 Z2=250-%i*132.625;
5 Z3=0-%i*132.625;
6 IR1=[Z1/TZ1]*[Z3/Z2];
7 disp(' CURRENT is in polar form = '+string(IR1)+'A'
   );
8 TZ2=173.64+%i*48.84;
9 Z4=20+%i*0;
```

```
10 Z5=250+%i*377;
11 Z6=0+%i*377;
12 IR2=[Z4/TZ2]*[Z6/Z5];
13 disp(' CURRENT is  in polar form = '+string(IR2)+'A'
     );
14 IR=[IR1^2+IR2^2]^0.5;
15 disp(' CURRENT is  in polar form = '+string(IR)+'A')
     ;
```

Scilab code Exa 5.7 Power Total Power

```
1       //EXAMPLE 5-7   PG NO-300
2 IR1=0.185;              //current
3 IR2=0.0924;             //current
4 R=250;                  //Resistance
5 P1=IR1*IR1*R;           //POWER
6 P2=IR2*IR2*R;           //POWER
7 P=P1+P2;                //POWER
8 disp('i) POWER (P1) is   =  '+string (P1)+'W ');
9 disp('i) POWER (P2) is   =  '+string (P2)+'W ');
10 disp('i) POWER (P) is   =  '+string (P)+'W ');
```

Scilab code Exa 5.8 Current

```
1                         //EXAMPLE 5-8   PG NO-301
2 Vcb=40/7;
3 Vth=-6.2857;
4 RTH=9.4286;
5 R=10;
6 I=-Vth/[R+RTH];
7 disp(' CURRENT is  in polar form = '+string(I)+'A');
```

Scilab code Exa 5.9 Deflection

```
1          //EXAMPLE 5-9  PG NO-302
2 V=10;    //Voltage
3 S=0.5*10^-5;
4 R1=2500;
5 R2=1050;
6 R3=200;
7 R4=500;
8 Van=(V/(R1+R4))*R4;
9 Vbn=(V/(R2+R3))*R3;
10 VTH=Van-Vbn;
11 RTH=((R1*R4)/(R1+R4))+((R2*R3)/(R2+R3));
12 I=VTH/(RTH+100);
13 GD=I/S;                          //Galvonater
     Deflection
14 disp('i) voltage (Van) is   =  '+string (Van)+'V ');
15 disp('i) Voltage (Vbn) is   =  '+string (Vbn)+'V ');
16 disp('i) Voltage (VTH) is   =  '+string (VTH)+'V ');
17 disp('i) Resistance (RTH) is   =  '+string (RTH)+'
     ohms ');
18 disp('i) CURRENT (I) is   =  '+string (I)+'A ');
19 disp('i) Galvoneter Deflection (GD) is   =  '+string
     (GD)+'mm ');
```

Scilab code Exa 5.10 Power dissipared

```
1          //EXAMPLE  5-10 PG NO-303
2 I1=(58/21);
3 R1=2;
4 R2=5;
5 R3=15;
```

```
6  VTH=R1+I1;                          //Thevenins Voltage
7  RTH=(1*(R2+R3))/(1+(R2+R3));        //Thevenins
       resistance
8  I=VTH/(10+RTH);                     //CURRENT
9  P=I*I*10;                           //POWER
10 disp('i)Thevenins voltage (VTH) is = '+string (
       VTH)+'V ');
11 disp('i) Thevenins resistance (RTH) is = '+
       string (RTH)+'ohm ');
12 disp('i) current (I) is = '+string (I)+'A ');
13 disp('i) power (P) is = '+string (P)+'W ');
```

Scilab code Exa 5.11 Voltage

```
1                                      //EXAMPLE 5-11
                                         PG NO-303
2  X=8+%i*8;                                  //X=I1/V1;
3  X1=0+%i*30/25+%i*80;                       //X1=Va/V1;
4  V1=[20*(25+%i*80)]/(0+%i*30);
5  disp(' VOLTAGE is in polar form = '+string(V1)+'V')
       ;
```

Scilab code Exa 5.12 Current

```
1              //EXAMPLE 5-12   PG NO304-305
2  I2=0.411+%i*0;
3  VTH=5+%i*0-(I2*5);
4  ZTH=1/(1+(1/2)+(1/5));
5  Iab=VTH/(ZTH+(2+%i*2));
6  disp('i) VOLTAGE (VTH) is in polar form = '+
       string (VTH)+'V ');
7  disp('i) IMPEDANCE (ZTH) is in polar form = '+
       string (ZTH)+'ohms ');
```

```
8 disp('i) Current (Iab) is    in polar form =  '+
    string (Iab)+'A ');
```

Scilab code Exa 5.13 Current

```
1              //EXAMPLE 5-13  PG NO-305
2 Z1=10+%i*0;
3 Z2=-%i*5;
4 Z3=3+%i*4;
5 Z4=3-%i*4;
6 Z5=10+%i*2.5;
7 VTH=(Z1*Z2)/(Z3+Z2);
8 ZTH=2+((20-%i*15)/(3-%i*1));
9 ZL=VTH/(ZTH+Z5);
10 disp('i) VOLTAGE (VTH) is    =  '+string (VTH)+'V ');
11 disp('i) IMPEDANCE (ZTH) is    =  '+string (ZTH)+'ohm
     ');
12 disp('i) IMPEDANCE (ZL) is    =  '+string (ZL)+'A ');
```

Scilab code Exa 5.14 Current

```
1          //EXAMPLE 5-14  PG NO-306
2 V1=120;
3 V2=65;
4 R1=40;
5 R2=60;
6 IN=(V1/R1)+(V2/R2);
7 RN=(R1*R2)/(R1+R2);
8 IRL=IN*(RN/(RN+11));
9 disp('i) Current (IN) is    =  '+string (IN)+'A ');
10 disp('i) Current (RN) is    =  '+string (RN)+'ohms ')
    ;
11 disp('i) Current (IRL) is    =  '+string (IRL)+'A ');
```

Scilab code Exa 5.15 Current

```
1           //EXAMPLE 5-15    PG NO-306
2 I2=-0.67;
3 R1=8;
4 R2=2;
5 R3=5;
6 RN=R1+((R2*R3)/(R2+R3));
7 I=-I2*(RN/(10+RN));
8 disp('i) Resistance (RN) is    =  '+string (RN)+'ohm
    ');
9 disp('i) Current3 (I) is    =  '+string (I)+'A ');
```

Scilab code Exa 5.16 Impedance

```
1       //EXAMPLE 5-16   PG NO-307
2 Z1=2.828+%i*2.828;
3 Z2=0+%i*2.5;
4 R=10;
5 Z3=3+%i*4;
6 IN=Z1+Z2;
7 ZN=(R*Z3)/(R+Z3);
8 disp('i) current (IN) is    =  '+string (IN)+'A ');
9 disp('i) impedance (ZN) is    =  '+string (ZN)+'ohms
    ');
```

Scilab code Exa 5.17 Impedance

```
1                           //EXAMPLE 5-17 PG NO-307-308
```

```
2  Z1=60+%i*0;
3  Z2=15.6-%i*9;
4  Z3=10.42-%i*6;
5  Z4=25.98-%i*15;
6  Z5=11.92-%i*1.4;
7  I=2.5*10^-3;
8  Vab=((Z1*Z2)/(Z3+Z2));
9  ZTH=(Z3*Z2)/(Z3+Z2);
10 Vax=I*Z3*10^3;
11 Vxy=Vab-Z4;
12 Zxy=ZTH+Z3;
13 IN=Z5/(Zxy*10^3);
14 ZN=Zxy;
15 disp('i) Voltage (Vab) is  = '+string (Vab)+'V');
16 disp('i) Impedance (ZTH) is  = '+string (ZTH)+'K
     ohms ');
17 disp('i) Voltage (Vax) is  = '+string (Vax)+' ');
18 disp('i) Voltage (Vxy) is  = '+string (Vxy)+'V');
19 disp('i) Impedance (Zxy) is  = '+string (Zxy)+'K
     ohms ');
20 disp('i) Current (IN) is  = '+string (IN)+'A ');
21 disp('i) Impedance (ZN) is  = '+string (ZN)+'K
     ohms ');
```

Scilab code Exa 5.18 Current and Resistance

```
1        //example  5-18  pg no-308-309
2  V=120;
3  R1=1200;
4  R2=400;
5  Vab=(V*R1)/(R1+R2);
6  Rab=(R1*R2)/(R1+R2);
7  IN=40/450;
8  RN=450;
9  disp('i) Voltage  (Vab) is  = '+string (Vab)+'V ')
```

```
    ;
10 disp('i) Resistance (Rab) is   =  '+string (Rab)+'
    ohms ');
11 disp('i) Current (IN) is   =  '+string (IN)+'  mA');
12 disp('i) Resistance (RN) is   =  '+string (RN)+'
    ohms ');
```

Scilab code Exa 5.19 RL Power

```
1         //EXAMPLE -19 PG NO-312
2 V=360;
3 R1=150;
4 R2=30;
5 Pm=900;
6 RL=25;
7 VTH=(V*R1)/(R1+R2);
8 RTH=(R1*R2)/(R1+R2);
9 TR=30+((R1*RL)/(R1+RL));          //total resistance
10 I=V/TR;                          //Current supplied
    by battery
11 P=V*7;                          //Power  supplied by
    battery
12 %PL=Pm*100/P                          //Percentage of
    power delivered to load
13 disp('i) Voltage (VTH) is   =  '+string (VTH)+'V ');
14 disp('i) Resistance (RTH) is   =  '+string (RTH)+'
    ohms ');
15 disp('i) Total resistance (TR) is   =  '+string (TR)
    +' ohms');
16 disp('i) Current (I) is   =  '+string (I)+' A ');
17 disp('i) power (P) is   =  '+string (P)+' W ');
18 disp('i) Percentage of power (%PL) is   =  '+string
    (%PL)+' % ');
```

Scilab code Exa 5.20 VOLTAGE

```
1         //EXAMPLE 5-20 PG NO -313
2 Z1=5+%i*0;
3 Z2=4-%i*3;
4 Z3=3+%i*3;
5 Z4=%i*3;
6 VTH=((Z1)/(3+(((Z4*Z2)/(Z3-Z4)))))*(Z4/(Z3-Z4))*(-Z4
    );
7 disp('i) Voltage (VTH) is    =  '+string (VTH)+'V ');
```

Scilab code Exa 5.21 ZL Power

```
1         //EXAMPLE 5-21 PG NO -313-314
2 Z1=8.66+%i*5;
3 Z2=%i*1;
4 VTH=Z1-(Z1-1)*0.9;
5 ZTH=Z2+((9*1)/(9+1));
6 I=VTH/((0.9+%i*1)+(0.9-%i*1));
7 P=1.02^2*0.9;
8 disp('i) Voltage (VTH) is    =  '+string (VTH) +' V '
    );
9 disp('i) Impedance(ZTH) is    =  '+string (ZTH) +' ')
    ;
10 disp('i) Current (I) is    =  '+string (I) +'A ');
11 disp('i) Power (VTH) is    =  '+string (P) +' W ');
```

Scilab code Exa 5.22 VOLTAGE

```
1           //EXAMPLE 5-22        PG NO-315-316
2 I1=100;
3 I2=80;
4 I3=5;
5 R1=100;
6 R2=50;
7 R3=200;
8 IN=I1+I2-I3;
9 X=1/R1+1/R2+1/R3;                    //1/RN=X
10 RN=X;
11 VTH=IN*RN;
12 RTH=RN
13 disp('i) Voltage (VTH) is    =   '+string (IN) +'V ');
14 disp('i) Voltage (VTH) is    =   '+string (1/RN) +'V '
   );
15 disp('i) Voltage (VTH) is    =   '+string (VTH) +'V ')
   ;
16 disp('i) Voltage (VTH) is    =   '+string (RTH) +'V ')
   ;
```

Scilab code Exa 5.23 Vo

```
1        //EXAMPLE 5-23     PG -NO 316-317
2 V11=-5;
3 V12=5;
4 V13=0;
5 G1=1/2200;
6 G2=1/3300;
7 G3=1/1500;
8 VO1=((V11*G1)+(V12*G2)+(V13*G3))/(G1+G2+G3);
9 V21=-5;
10 V22=10;
11 V23=0;
12 VO2=((V21*G1)+(V22*G2)+(V23*G3))/(G1+G2+G3);
13 disp('i) Voltage (VO1) is    =   '+string (VO1) +'V ')
```

```
    ;
14 disp('i) Voltage (VO2) is    =  '+string (VO2) +'V ')
    ;
```

Scilab code Exa 5.24 Voltage

```
1  Z1=10+%i*0;
2  Z2=99.33-%i*49.09222;
3  Z3=20+%i*0;
4  Z4=10+%i*20;
5  Z5=20.03+%i*30.03;
6  Z6=15+%i*20;
7  Z7=89.32-%i*49.105;
8  IN=Z1+Z2-Z3;
9  ZN=1/((1/Z4)+(1/Z5)+(1/Z6));
10 VTH=(Z7/1000)*ZN;
11 ZTH=ZN
12 disp('i) Current (IN) is   in rectangular form   =
     '+string (IN) +'V ');
13 disp('i) Impedance (1/ZN) is  in rectangular form
    =  '+string (1/ZN) +'V ');
14 disp('i) Voltage (VTH) is in rectangular form      =
      '+string (VTH) +'V ');
15 disp('i) Impedance (ZTH) is  in  rectangular form
    =  '+string (ZTH) +'ohm ');
```

Scilab code Exa 5.25 Current

```
1                                   //EXAMPLE 5-25
                                          PG NO
                                      -318-319
2  I1=4.4-%i*1.012;                                  //
     Current
```

```
3 I2=I1*[(%i*5)/(3+%i*9)];
4 Z1=1;
5 I11=[I2/[10*%i*5]]*[%i*5/10+%i*5];
6 disp(' Current is  in polar form = '+string(I1)+'A')
    ;
7 disp(' Current is  in polar form = '+string(I2)+'A')
    ;
8 disp(' Current is  in polar form = '+string(I11)+'A'
    );
9 I12=I1-I11;
10 disp(' Current is  in polar form = '+string(I12)+'A'
    );
```

Scilab code Exa 5.26 Current

```
1                    //EXAMPLE   5-26   PG NO-319-320
2 Z1=70.71+%i*70.71;
3 Z2=10+%i*5;
4 Z3=-%i*5;
5 Z4=%i*5;
6 Z5=5-%i*5;
7 X1=[Z2 Z3 Z1,Z3 10 0,0 Z4 0];
8 X2=[Z2 Z3 0,Z3 10 Z4,0 Z4 Z5];
9 X3=[0 Z3 0,0 10 Z4,Z1 Z4 Z5];
10 X4=[Z2 Z3 0,Z3 10 Z4,0 Z4 Z5];
11 I3=X1/X2;
12 I1=X3/X4;
13 disp('i) Current (I3) is   in polar  =  '+string (I3
    ) +' A ');
14 disp('i) Current (I1) is   in polar  =  '+string (I1
    ) +' A ');
```

Scilab code Exa 5.27 Delta to Star

```
1       //EXAMPLE 5-27  PG NO-321
2 Z1=(6-%i*2.41);          //Impedance
3 Z2=(0-%i*9.64);          //Impedance
4 Z3=4+%i*0;               //Impedance
5 Z4=2+%i*0;              //Impedance
6 Z5=0-%i*2.41;            //Impedance
7 Za=Z2/Z1;                //Impedance
8 Zb=(Z3*Z4)/Z1;            //Impedance
9 Zc=(Z4*Z5)/Z1;            //Impedance
10 disp('i) Impedance (Za) is    in polar  =  '+string (
    Za) +'  ohms ');
11 disp('ii) Impedance (Zb) is    in polar  =  '+string
    (Zb) +'  ohms ');
12 disp('iii) Impedance (Zc) is    in polar  =  '+string
    (Zc) +'  ohms ');
```

Scilab code Exa 5.28 Total Impedance

```
1       //EXAMPLE 5-28   PG NO-322
2 Z1=0.6-%i*1.2;
3 Z2=0.6-%i*1.2;
4 Z3=1.2+%i*0.6;
5 Z=Z1+(((Z2+3)*(Z3+%i*3))/(Z2+3+Z3+%i*3));
6 disp('i) Impedance (Z) is    in polar  =  '+string (Z
    ) +'  ohms ');
```

Scilab code Exa 5.29 Current

```
1     //EXAMPLE 5-29    PG NO 323
2 V1=5;                      //Voltage
3 V2=0.05;                   //Voltage
4 R1=100;                     //Resistance
5 R2=1000;                   //Resistance
```

```
R3=85;
R4=880;;
I1=0.00266;                    //Current
I2=0.02676;                    //Current
Va=V1-R1*I2;
Vb=V1-R2*I1;
VTH=Va-Vb;
RTH=((R1*R3)/(R1+R3))+(R2*R4)/(R2+R4)
I=(0.016)/(RTH+20);
disp('i) Voltage (Va) is    in polar  =  '+string (Va
   ) +'  V ');
disp('i) Voltage (Vb) is    in polar  =  '+string (Vb
   ) +'  V ');
disp('i) Voltage (VTH) is    in polar  =  '+string (
   VTH) +'  V ');
disp('i) Resistance (RTH) is    in polar  =  '+string
    (RTH) +'  ohms ');
disp('i) Current (I) is      =  '+string (I) +'  A ')
   ;
```

Scilab code Exa 5.30 Current

```
                //EXAMPLE 5-30     PG NO 324-325
V=25;                             //Voltage
R1=50;                           //RESISTANCE
R2=35;                          //RESISTANCE
R3=60;                         //RESISTANCE
R4=10;
VTH=V-(R1*(R2/R3));          //THEVENINS VOLTAGE
RTH=(R1*R4)/R3;
I40=-(VTH/(40+RTH));
V40=40*I40;
disp('i) Impedance (VTH) is      =  '+string (VTH) +'
    V ');
disp('i) Impedance (RTH) is      =  '+string (RTH) +'
```

```
      ohm ');
13 disp('i) Impedance (I40) is      =  '+string (I40) +'
      A ');
14 disp('i) Impedance (V40) is      =  '+string (V40) +'
      V ');
```

Scilab code Exa 5.31 Current

```
1                 //EXAMPLE 5-31    PG NO-326;
2 V=25;
3 R1=50;
4 R2=40;
5 R3=10;
6 I=(V/(R1+((R2*R3)/(R2+R3))))*(R3/(R2+R3));
7 disp('i) Current (I) is    =  '+string (I) +'  A ');
```

Scilab code Exa 5.32 RL for Pmax

```
1                  //EXAMPLE 5-32      PG NO=326
2 V1=60;                 //VOLTAGE
3 V2=50;                 //VOLTAGE
4 V3=100;                //VOLTAGE
5 R1=60;               //RESISTANCE
6 R2=30;             //RESISTANCE
7 R3=40;           //RESISTANCE
8 VTH=V2+(R2*(2/3))-(R1*1);
9 RTH=((R1*R2)/(R1+R2))+((R1*R3)/(R1+R3));
10 RL=RTH;
11 I=VTH/(RTH+RTH);                    //CURRENT
12 P=(I*I)*RL;                         //POWER
13 disp('i) Voltage (VTH) is     =  '+string (VTH) +'  V
     ');
```

```
14 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
       ');
15 disp('i) Load Resistance (RL) is    =  '+string (RL)
    +'  ohm ');
16 disp('i) Current (I) is    =  '+string (I) +'  A ');
17 disp('i) Power (P) is    =  '+string (I) +'  W ');
```

Scilab code Exa 5.33 Current

```
1         //EXAMPLE 5-33    PG NO=327
2 R1=15;    //RESISTANCE
3 R2=8;     //RESISTANCE
4 R3=12;     //RESISTANCE
5 R4=10;
6 R5=5.14;;
7 R6=7.429;
8 R7=32.74;
9 V=60;
10 Ra=(R1*R2)/ (R1+R2+R3);
11 Rb=(R3*R2)/(R1+R2+R3);
12 Rc=(R1*R3)/(R1+R2+R3);
13 TR=R4+R5+((R6*R7)/(R6+R7));       //TOTAL  RESISTANCE
14 I=V/TR
15 disp('i) Resistance (Ra) is    =  '+string (Ra) +'
    ohms  ');
16 disp('i) Resistance (Rb) is    =  '+string (Rb) +'
     ohms ');
17 disp('i) Resistance (Rc) is    =  '+string (Rc) +'
    ohms  ');
18 disp('i) Total Resistance (TR) is    =  '+string (TR
    ) +' ohms  ');
19 disp('i) Current (I) is    =  '+string (I) +'  A ');
```

Scilab code Exa 5.34 Pmax Total Power RL

```
1          //EXAMPLE 5-34  PG NO-327-328
2 V=10;
3 R1=1;
4 R2=2;
5 R3=8.5;
6 VTH=V*(R1/R2);                          //Thevenins
     Voltage
7 RTH=R2+((R1*R1)/(R1+R1))+R2;           //Thevenins
     Resistance
8 Pmax=(5/9)^2*RTH;
9 TR=R1+((R1*R3)/(R1+R3));                //Total Resistance
10 TP=V*(V/TR);                          //Total Power
11 disp('i) Voltage (VTH) is    =  '+string (VTH) +' V
     ');
12 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
     ohms ');
13 disp('i) Power (Pmax) is    =  '+string (Pmax) +' W
     ');
14 disp('i) Total resistance (TR) is    =  '+string (TR
    ) +'  ohms ');
15 disp('i) Total Power (TP) is    =  '+string (TP) +'
     W ');
```

Scilab code Exa 5.35 Thevenins equivalent circuits

```
1          //EXAMPLE 5-35   PG NO-328-329
2 Va=6;          //VOLTAGE  at PONT A
3 Vb=-3;          //VOLTAGE   at POINT B
4 VTH=Va-Vb;
5 R1=1;
6 R2=2;
7 R3=3;
8 RTH=((R2*R3)/(R2+R3))+((R1*R3)/(R1+R3));
```

```
9 disp('i) Voltage (VTH) is = '+string (VTH) +' V
      ');
10 disp('i) Resistance (RTH) is = '+string (RTH) +'
      ohm ');
```

Scilab code Exa 5.36 maximum Power

```
1                                          //EXAMPLE 5-36
                                                PG NO
                                             =329
2 I1=-10;                                     //CURRENT
3 Vpc=15;
4 I2=7.5;
5 Vqc=I2*1;
6 disp(' Voltage is = '+string(Vqc)+'V');
7 Vpq=Vpc-Vqc;
8 disp(' Voltage is = '+string(Vpq)+'V');
9 RTH=1.406;
10 Pmax=[I2/(2*RTH)]^2*RTH;
11 disp(' Power is = '+string(Pmax)+'W');
```

Scilab code Exa 5.37 Current

```
1                                          //EXAMPLE 5-37
                                                PG
                                             NO-330-331
2 R=8;
3 R1=12.67;
4 R2=4;
5 R3=10;
6 R4=3.077;
7 R5=13.077;
```

```
R50=9.9;                                //RESISTANCE AT 50 V
   BATTERY
V=50;                                   //VOLTAGE
I1=V/R50;                               //CURRENT
I=I1*[R/(R+R1)];
disp(' Current is (I1) = '+string(I1)+'A');
disp(' Current is (I) = '+string(I)+'A');
R100=R+[(R2*(R3+R4))/(R2+R3+R4)];
disp(' Resistance at 100 (R100) is = '+string(R100
   )+'ohm');
I2=100/R100;
disp(' Current is (I2) = '+string(I2)+'A');
I3=[(I2*R2)/(R2+R5)];
disp(' Current is (I3) = '+string(I3)+'A');
I10=I3-I;
disp(' Current is (I10) = '+string(I10)+'A');
```

Scilab code Exa 5.38 Current

```
        //EXAMPLE 5-38 PG NO-331
R1=100;
R2=4;
R3=8;
R4=50;
R5=5;
VTH=(R1*((R2)/(R2+R3)))-((R3*R4)/(R3+R5));
RTH=((R3*R5)/(R3+R5))+((R2*R3)/(R2+R3));
I=VTH/(10+RTH);
disp('i) Voltage (VTH) is = '+string (VTH) +' V
    ');
disp('i) Resistance (RTH) is = '+string (RTH) +'
    ohm ');
disp('i) Current (I) is = '+string (I) +' A ');
```

Scilab code Exa 5.39 RL and Pmax

```
1       //EXAMPLE 5-39    PG NO-331
2  V=36;
3  R1=5;
4  R2=11;
5  R3=6;
6  VTH=V*(R1/R2);
7  RTH=(R1*R3)/(R1+R3);
8  R=RTH;
9  Pmax=(VTH/(2*RTH))^2*(RTH);
10 disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
       ');
11 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
       ohm ');
12 disp('i) Maximum Power (Pmax) is    =  '+string (
     Pmax) +'  W ');
```

Scilab code Exa 5.40 R and Current

```
1        //EXAMPLE 5-40   PG NO-331-332
2  R1=3;
3  R2=2;
4  R3=12;
5  R4=4;
6  R5=8;
7  V=10;
8  R=R3/(R1/R2);
9  TR=R4+((R2*R5)/(R2+R5))+((R1*R3)/(R1+R3));
10 I=V/TR;
11 Ir=I*(R2/(R5+R2));
```

```
12 disp('i) Resistance (R) is    =  '+string (R) +'
     ohm ');
13 disp('i) Total Resistance (TR) is    =  '+string (TR
     ) +'  ohm ');
14 disp('i) Current (I) is    =  '+string (I) +'  A ');
15 disp('i) Current (Ir) is    =  '+string (Ir) +'  A '
     );
```

Scilab code Exa 5.41 Current

```
1         //EXAMPLE 5-41  PG NO-332-333
2 VTH=10;
3 V=10;
4 R1=10;
5 R2=10;
6 R3=16.67;
7 R4=50;
8 R5=5.56;
9 R6=3.33;
10 RTH=V+R5+(((R1+R3)*(R4+R6))/(R1+R3+R4+R6));
11 I=(V/RTH)-0.4;
12 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
     ohm ');
13 disp('i) Currrent (I) is    =  '+string (I) +'  A ')
     ;
```

Scilab code Exa 5.42 Current

```
1     //EXAMPLE 5-42   PG NO-333
2 V=100;              //Voltage
3 RTH=0;              //Resistance
4 Iab=V/20;           //Current
```

```
5 disp('i) Current (Iab) is    =  '+string (Iab) +'  A
    ');
6 Iab=V/20;
```

Scilab code Exa 5.43 Current

```
1       //EXAMPLE 5-43 PG NO-333
2 Vab=38;         //Voltage
3 R1=12;
4 R2=6;
5 RTH=(R1*R2)/(R1+R2);
6 Iab=Vab/(RTH+3);
7 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
    ohm ');
8 disp('i) Current (Iab) is    =  '+string (Iab) +'  A
    ');
```

Scilab code Exa 5.44 current resistance

```
1     //EXAMPLE 5-44 PG NO-333-334
2 I1=1.6;
3 I2=0.8;
4 VTH=6*I2;                                    // ((R1*R2)/(
    R1+R2))
5 R1=3;
6 R2=9;
7 R3=6;
8 R4=3;
9 RTH=((((R1*R2)/(R1+R2))+R1)*R3)/(((R1*R2)/(R1+R2))+
    R1+R2);
10 IN=VTH/RTH;
11 RN=RTH;
```

```
12 disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
     ');
13 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
     ohm ');
14 disp('i) Current (IN) is    =  '+string (IN) +'  A '
   );
15 disp('i) Resistance (RN) is    =  '+string (RN) +'
   ohm ');
```

Scilab code Exa 5.45 Current

```
1          //EXAMPLE5-45  PG NO-334-335
2 R1=10;
3 R2=5;
4 V=15;
5 Vb=9;
6 Va=(V*R2)/(R1+R2);
7 Vba=Vb-Va;
8 RTH=(R1*R2)/(R1+R2);
9 VTH=Vba;
10 Iba=VTH/(RTH+Vba);
11 disp('i) Voltage (Va) is    =  '+string (Va) +'  V '
   );
12 disp('i) Voltage (Vba) is    =  '+string (Vba) +'  V
     ');
13 disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
     ');
14 disp('i) REsistance (RTH) is    =  '+string (RTH) +'
     ohms ');
15 disp('i) Current (Iba) is    =  '+string (Iba) +'  A
     ');
```

Scilab code Exa 5.46 Load Resistance

```
1          //EXAMPLE 5-46    PG NO-335
2  R1=1;
3  R2=1;
4  R3=3;
5  RTH=R1+((R2*R3)/(R2+R3));
6  RL=R3/(RTH+RTH);
7  P=RL^2*RTH;
8  disp('i) Resistance (RTH) is     =  '+string (RTH) +'
       ohms ');
9  disp('i) Resistance (RL) is     =  '+string (RL) +'
     A ');
10 disp('i) Power (P) is     =  '+string (P) +'  W ');
```

Scilab code Exa 5.47 Thevenins and Nortan Equivalent

```
1            //EXAMPLE 5-47    PG NO-336
2  V=5;              //VOLTAGE
3  R1=2;
4  R2=1;
5  VTH=R1+((V-R1)/3);
6  RTH=R2+((R1*R2)/(R1+R2));
7  IN=((V*0.5)/(R1+0.5))+((R1/RTH)*(R1/VTH))
8  disp('i) Voltage (VTH) is     =  '+string (VTH) +'  V
       ');
9  disp('i) Resistance (RTH) is     =  '+string (RTH) +'
       ohm ');
10 disp('i) Current (IN) is     =  '+string (IN) +'  A '
     );
```

Scilab code Exa 5.48 Current

```
1      //EXAMPLE 5-48          PG NO-336-337
2  V=24;
```

```
R1=4;
R2=4;
Iab=V/(R1+R2);
Idb=6;
Iba=(Idb/(R1+R2))*R1;
Ibc=Iab+Iba;
IDB=Ibc;
disp('i) CURRENT (Iab) is     =  '+string (Iab) +'  A
    ');
disp('i) CURRENT (Iba) is     =  '+string (Iba) +'  A
    ');
disp('i) CURRENT (Ibc) is     =  '+string (Ibc) +'  A
    ');
disp('i) CURRENT (IDB) is     =  '+string (IDB) +'  A
    ');
```

Scilab code Exa 5.49 current

```
                        //EXAMPE 5-49      PG NO-337-338
V1=120;
V2=65;
R1=20;
R2=30;
VTH=V1-((V1-V2)/(R1+R2))*R1;
RTH=(R1*R2)/(R1+R2);
disp('i) Voltage (VTH) is     =  '+string (VTH) +'  V
    ');
disp('i) Resistance (RTH) is     =  '+string (RTH) +'
     ohms ');
```

Scilab code Exa 5.50 Current

```
        //EXAMPLE - 5-50      PG NO-338
```

```
V1=240;
V2=140;
V=40;
R1=2;
R2=8;
R3=30;
VTH=((V1/V)*R3)-V2;
RTH=R1+((R3*(R1+R2))/V)+0.5;
I=VTH/(RTH+V2);
disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
    ');
disp('i) Reesistance (RTH) is    =  '+string (RTH) +
    '  ohms ');
disp('i) CURRENT (I) is    =  '+string (I) +'  A ');
```

Scilab code Exa 5.51 Resistance Power

```
                    //EXAMPLE 5-51    PG NO-338
I=10;              //CURRENT
R1=1;
R2=1;
R3=1;
VTH=(I*R1)/(R1+R2+R3);
RTH=(R1*(R1+R2))/(R1+R2+R3);
P=(VTH/(RTH+RTH))^2*(RTH);
disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
    ');
disp('i) Resistance (RTH) is    =  '+string (RTH) +'
     ohms ');
disp('i) Power (P) is    =  '+string (P) +'  W ');
```

Scilab code Exa 5.52 Current

```
1              //EXAMPLE  5-52   PG NO-339
2  R1=2;
3  R2=4;
4  R3=2;
5  V=0.389;                 //VOLTAGE
6  I1=3.89;                //CURRENT
7  TR=((R1*R2)/(R1+R2))+R2;       //TOTAL RESISTANCE
8  I=V/TR;                      //CURRENT
9  TI=I1+I;                     //TOTAL   CURRENT
10 disp('i) Total resistance (TR) is    =  '+string (TR
     ) +'  ohms ');
11 disp('i) Current (I) is    =  '+string (I) +'  A ');
12 disp('i) Total current (TI) is    =  '+string (TI) +
     '  A ');
```

Scilab code Exa 5.53 `Vth Rth`

```
1                  //EXAMPLE 5-53   PG NO-339
2  R1=16;
3  R2=8;
4  R3=12;
5  Rd=(R1*R2)/(R1+R2+R1);
6  Rb=Rd;
7  Rc=(R1*R1)/(R1+R1+R2);
8  V=180;
9  VTH=[180/(R1+Rd+Rc)]*Rc;
10 RTH=R3+[((Rc*(R1+Rd)))/(R1+Rc+Rd)]+Rd;
11 disp('i) Resistance (Rd) is    =  '+string (Rd) +'
     ohms ');
12 disp('i) Resistance (RC) is    =  '+string (Rc) +'
     ohms ');
13 disp('i) Voltage (VTH) is    =  '+string (VTH) +'  V
      ');
14 disp('i) Resistance (RTH) is    =  '+string (RTH) +'
      ohms ');
```

Scilab code Exa 5.54 Current

```
1                                   //EXAMPLE 5-54    PG NO-340
2 V1=48;                                             //VOLTAGE
3 V2=16;                                             //VOLTAGE
4 R1=12;
5 R2=4;
6 R3=4;
7 I=(V1-V2)/(R1+R2+R3);
8 disp('i) Current (I) is     =  '+string (I) +'  A ');
```

Scilab code Exa 5.55 Current

```
1                                   //EXAMPLE 5-55     PG NO
                                      -340-341
2 I1=1.2;                             //Current
3 I2=0.3;                            //Current
4 I=I1+I2;
5 disp(' Current is    = '+string(I)+'A');
```

Scilab code Exa 5.56 Current

```
1                                 //EXAMPLE 5-56          PG NO-341
2 VTH=15;                                        //THEVENINS VOLTAGE
3 R1=4;
4 R2=6;
5 I4=VTH/(R1+R2);                                //CURRENT
     THROUGH   4 ohms    Resistance
```

```
6 disp('i) CURRENT (I4) is     =  '+string (I4) +'  A '
    );
```

Scilab code Exa 5.57 Current

```
1                          //EXAMPLE 5-57       PG NO-341-342
2 R1=22;
3 R2=33;
4 R3=10;
5 R4=15;
6 V=24;
7 TR=[(R1+R2)*(R3+R4)]/(R1+R2+R3+R4);
8 I=V/TR;
9 disp('i) Total Resistance (TR) is     =  '+string (TR
    ) +'  Kohms ');
10 disp('ii) CURRENT (I) is     =  '+string (I) +'  A ')
    ;
```

Scilab code Exa 5.58 Resistance

```
1                          //EXAMPLE 5-57       PG NO-341-342
2 R1=22;
3 R2=33;
4 R3=10;
5 R4=15;
6 V=24;
7 TR=[(R1+R2)*(R3+R4)]/(R1+R2+R3+R4);
8 I=V/TR;
9 disp('i) Total Resistance (TR) is     =  '+string (TR
    ) +'  Kohms ');
10 disp('ii) CURRENT (I) is     =  '+string (I) +'  A ')
    ;
```

Scilab code Exa 5.60 Current

```
1                                   //EXAMPLE 5-60   PG NO-343
2 V=60;                               //VOLTAGE
3 R1=3;
4 R2=4;
5 R3=1.5;
6 R4=2.5;
7 IAB=12;
8 IBC=6;
9 ICD=6;
10 IBD=6;
11 VAB=36;
12 VBC=9;
13 VCD=15;
14 VBD=24;
15 VkIk=VAB*IAB+VBC*IBC+VCD*ICD+VBD*IBD-V*IAB
16 disp('ii) SUBMISSION OF VkIk (VkIk) is    =   '+
     string (VkIk) +'    ');
```

Scilab code Exa 5.62 Nortan equivalent

```
1                                   //EXAMPLE 5-62          PG NO
                                      -344-345
2 Z1=16+%i*0;
3 Z2=2+%i*1;
4 Z3=3-%i*1;
5 R=4;
6 I=Z1/[Z2+[(R*Z3)/(R+Z3)]];
7 disp(' Current is    = '+string(I)+'A');
8 IN=[I*Z3]/(R+Z3);
9 disp(' Current is    = '+string(IN)+'A');
```

```
10 ZN=[[Z3*Z2]/5]+R;
11 disp(' Impedance is    = '+string(ZN)+'A');
```

Scilab code Exa 5.63 Thevenins Equivalent

```
1                          //EXAMPLE 5-63  PG NO-345
2 IN=1.638-%i*0.614;
3 Z1=15+%i*0;
4 Z2=3-%i*1;
5 Z3=2+%i*1;
6 VTH=(Z1*Z2)/(Z3+Z2);
7 ZN=5.4+%i*0.21;
8 VTH1=IN*ZN
9 disp('ii) Voltage (VTH) is     =  '+string (VTH) +'
    V ');
10 disp('ii) Voltage (VTH) is     =  '+string (VTH) +'
    V ');
```

Scilab code Exa 5.64 ZL Power

```
1                  //EXAMPLE 5-64   PG  NO-345-346
2 Z1=4+%i*6;
3 R1=1;
4 V=100;
5 ZTH=(Z1*R1)/(Z1+R1);
6 Pmax=[100/(ZTH+ZTH)]^2*[0.93*cos(-6.11)]
7 disp('i) IMPEDANCE (ZTH) is     =  '+string (ZTH) +'
     ohms ');
8 disp('ii) POWER (Pmax) is     =  '+string ([Pmax]) +'
     W ');
```

Scilab code Exa 5.65 Current

```
1             //EXAMPLE 5-65        PG NO-346
2 V1=5;
3 G1=1;
4 V2=5;
5 G2=(1/2);
6 V3=10;
7 G3=(1/4);
8 EV=(V1*G1+V2*G2+V3*G3)/(G1+G2+G3);                    //
    EQUIVALENT VOLTAGE
9 ER=1/(G1+G2+G3);
10 I=(EV*ER)/(EV+ER);
11 disp('i) Euivalent Resistance (EV) is    = '+string
     (EV) +' V ');
12 disp('ii) Equivalent Resistance (ER) is    = '+
    string (ER) +' ohms ');
13 disp('ii) CURRENT (I) is    = '+string (I) +' A ')
    ;
```

Scilab code Exa 5.66 Change in current

```
1 Z1=12.99+%i*7.5;
2 Z2=4-%i*3;
3 Z3=6+%i*8;
4 I1=Z1/Z2;
5 Z=Z3-Z2
6 I=(I1*Z)/Z3;
7 disp('ii) CURRENT (I1) is  in polar form  = '+
    string (I1) +' A ');
8 disp('i) IMPEDANCE (Z) is  in polar form  = '+
    string (Z) +' V ');
9 disp('ii) CURRENT (I) is  in polar form  = '+string
     (I) +' A ');
```

Scilab code Exa 5.67 Reciprocity Theorem

```
1                    //EXAMPLE 5-67 PG NO-347-348
2  V=10;               //VOLTAGE
3  R1=3;
4  R2=4.91;            //RESISTANCE
5  I1=V/R1;           //CURRENT
6  Isc1=1.11;
7  I2=V/R2;
8  Isc2=1.11;
9  disp('ii) CURRENT (I1) is     =  '+string (I1) +'  A
       ');
10 disp('ii) CURRENT (I2) is     =  '+string (I2) +'  A
       ');
```

Scilab code Exa 5.68 Equivalent Voltage

```
1                          //EXAMPLE 5-68          PG NO-348
2  V1=3;
3  V2=0.75;
4  R1=1;
5  R2=0.75;
6  V=V1+V2;
7  R=R1+R2;
8  disp('ii) Voltage (V) is     =  '+string (V) +'  V ')
       ;
9  disp('ii)Resistance (R) is     =  '+string (R) +'
       ohms ');
```

Scilab code Exa 5.69 Current

```
1                    //EXAMPLE 5-69     PG NO-349
2 V=24;                                 //VOLTAGE
3 R1=0.1;
4 R2=6;
5 R3=5;
6 I=V/[R1+(R3*R2)/(R3+R2)];
7 I1=I*(R3/(R2+R3));
8 I2=I*(R2/(R2+R3));
9 VTH=-(I1*2)-(-2*I2);
10 RTH=2.533;
11 IAB=VTH/(RTH+1);
12 disp('ii) CURRENT (I) is     =  '+string (I) +'  A ')
    ;
13 disp('ii) CURRENT (I1) is    =  '+string (I1) +'  A
    ');
14 disp('ii) CURRENT (I2) is    =  '+string (I2) +'  A
    ');
15 disp('ii) Voltage (VTH) is    =  '+string (VTH) +'
   V ');
16 disp('ii) CURRENT (IAB) is    =  '+string (IAB) +'
   A ');
```

Scilab code Exa 5.70 Current

```
1                  //EXAMPLE 5-70       PG NO-350
2 R1=2;
3 R2=3;
4 R3=6;
5 I4=R2*(R1/R3);                    //CURRENT THROUGH   4
   OHMS RESISTANCE
6 TI=I4+I4;                         //TOTAL CURRENT
7 disp('ii) CURRENT (I4) is     =  '+string (I4) +'  A
    ');
```

```
8 disp('ii) CURRENT (TI) is     =   '+string (TI) +'  A
    ');
```

Scilab code Exa 5.71 Current in R3

```
1                   //EXAMPLE 5-71     PG NO=350-351
2 R1=5;
3 R2=4;
4 R3=10;
5 R=R1*R2/(R1+R2);
6 I=(R*R3)/(R+R3);
7 disp('ii) Resitance (R) is     =   '+string (R) +'
    ohms ');
8 disp('ii) CURRENT (I) is     =   '+string (I) +'  A ')
    ;
```

Scilab code Exa 5.73 matrix

```
1 X=[4 2 ;2  4 ];
2 B=[20;10];
3 X=B
4 disp(' Current is    = '+string(X)+'A');
```

Scilab code Exa 5.74 Reciprocity Theorem

```
1 R1=15;
2 V=20                  //RESISTANCE
3 I1=V/R1;
4 I2=I1*(1/2);
5 R2=15;
```

```
6  I1=V/R2;
7  I2=I1*(1/2);
8  disp('ii) CURRENT (I1) is     =  '+string (I1) +'  A
       ');
9  disp('ii) CURRENT (I2) is     =  '+string (I2) +'  A
       ');
10 disp('ii) CURRENT (I1) is     =  '+string (I1) +'  A
       ');
11 disp('ii) CURRENT (I2) is     =  '+string (I2) +'  A
       ');
```

Chapter 7

Two Port Network

Scilab code Exa 7.2 Z Parameter

```
1                                                    //EXAMPLE 7-2
                                                       PG NO
                                                     -437-438
2  Z11=99+%i*99;
3  Z12=-%i*100;
4  Z21=20-%i*102.26;
5  Z22=90.06-%i*120;
6  Z1=Z11-Z12;
7  disp('i) Impedance (Z1) is in rectangular form =
       '+string (Z1) +'ohm ');
8  Z2=Z22-Z12;
9  disp('ii) Impedance (Z2) is in rectangular form =
       '+string (Z2) +'ohm ');
10 Z3=Z21-Z12;
11 disp('iii) Impedance (Z3) is in rectangular form
       = '+string (Z3) +'ohm ');
```

Scilab code Exa 7.4 Z and Y Parameter

```
1                                    //EXAMPLE 7-4          PG NO
                                       438-439
2  Z11=-0.4;
3  Z21=0.4;
4  Z12=-3.2;
5  Z22=1.2;
6  Z=[Z11 Z12;Z21 Z22];
7  X=det(Z);
8  disp(' delta is    = '+string(X)+'');
9  Y=[(Z22/X) (-Z12/X);(-Z21/X) (Z11/X)];
10 disp(' ADMITTANCE is    = '+string(Y)+'');
```

Scilab code Exa 7.5 Z and Y Parameter

```
1                                    //EXAMPLE 7-5          PG NO
                                       -439-440
2  Z11=-0.4;
3  Z21=-3.2;
4  Z12=0.4;
5  Z22=1.2;
6  Z=[Z11 Z12;Z21 Z22];
7  X=det(Z);
8  disp(' delta is    = '+string(X)+'');
9  Y=[(Z22/X) (-Z12/X);(-Z21/X) (Z11/X)];
10 disp(' ADMITTANCE is    = '+string(Y)+'');
```

Scilab code Exa 7.8 Current and Voltage

```
1                                                    //EXAMPLE
                                                       7-8
                                                        PG
                                                      NO-442
2  Y11=0.5;
```

```
Y21=-0.1;
Z1=0.1;
Z2=0.9;
Z=(Z1*Z2)/(Z1+Z2);
disp('i) Impedance (Z) is in rectangular form =
    '+string (Z) +'mho ');
I1=10*Z;
disp('ii) Current (I) is in rectangular form =
    '+string (I1) +'A ');
V11=I1/I1;
disp('i) VOLTAGE (V11) is in rectangular form =
    '+string (V11) +'V ');
```

Scilab code Exa 7.14 Y Parameter

```
                                    //EXAMPLE 7-14 PG
                                    NO469-470
Y11a=0.86;
Y11b=1.5;
Y12a=-0.57;
Y12b=-0.5;
Y21a=-0.57;
Y21b=-0.5;
Y22a=0.714;
Y22b=2.5;
Y11=Y11a+Y11b;
disp('i) IMPEDANCE (Y11) is = '+string (Y11) +'
   mho ');
Y12=Y12a+Y12b;
disp('i) IMPEDANCE (Y12) is = '+string (Y12) +'
   mho ');
Y21=Y21a+Y21b;
disp('i) IMPEDANCE (Y21) is = '+string (Y21) +'
   mho ');
Y22=Y22a+Y22b;
```

```
17 disp('i) IMPEDANCE (Y22) is    =  '+string (Y22) +'
     mho ');
```

Scilab code Exa 7.16 Image Parameter

```
1                              //EXAMPLE 7-16        PG NO-473
2 Zoc1=40;
3 Zsc1=36.67;
4 Zi1=sqrt((Zoc1*Zsc1));
5 disp('i) IMPEDANCE (Zi1) is    =  '+string (Zi1) +'
     ohm ');
6 Zoc2=30;
7 Zsc2=27.5;
8 Zi2=sqrt((Zoc2*Zsc2));
9 disp('ii) IMPEDANCE (Zi2) is    =  '+string (Zi2) +'
     ohm ');
10 TETA=1/tanh(0.9167);
11 disp('iii)  (TETA) is    =  '+string (TETA) +'degree
     ');
```

Scilab code Exa 7.17 Insertion Loss

```
1                                          //EXAMPLE 7-17    PG
                                             NO-474-475
2 R=600;                                  //RESISTANCE
3 I1=1/1200.13;
4 disp(' Current is    = '+string(I1)+'A');
5 I2=1/3793.54;
6 disp(' Current is    = '+string(I2)+'A');
7 P20=23984.9;
8 P2=2400;
9 IL=10*log10(P20/P2);
10 disp(' Insertion Loss is    = '+string(IL)+'dB');
```

Scilab code Exa 7.18 Impedance

```
1                                    //EXAMPLE 7-18  PG NO
                                       -477-478
2  Ra=7;
3  Rb=3;
4  Rc=3;
5  A=(Ra+Rb)/Rb;
6  disp(' A  is   = '+string(A)+'');
7  B=Ra+Rc+[(Ra*Rc)/Rb];
8  disp(' B is   = '+string(B)+'');
9  C=1/Rb;
10 disp(' C is   = '+string(C)+'');
11 D=(Rb+Rc)/Rb;
12 disp(' D is   = '+string(D)+'');
13 Z11=[(A*B)/(C*D)]^0.5;
14 disp(' Impedance is   = '+string(Z11)+'ohm');
15 Z12=[(B*D)/(A*C)]^0.5;
16 disp(' Impedance is   = '+string(Z12)+'ohm');
17 Q=1/cosh(2.62);
18 Y12=-(1/17);
19 disp(' Admittance is   = '+string(Y12)+'siemens');
```

Scilab code Exa 7.20 Admittance Parameter

```
1  Zoc1=2.923;
2  Zsc1=1.80;
3  Zi1=sqrt((Zoc1*Zsc1));
4  disp('i) IMPEDANCE (Zi1) is   =  '+string (Zi1) +'
     ohm ');
5  Zoc2=4.77;
```

```
6  Zsc2=2.95;
7  Zi2=sqrt((Zoc2*Zsc2));
8  disp('ii) IMPEDANCE (Zi2) is  = '+string (Zi2) +'
      ohm ');
9  TETA=1/tanh(0.619);
10 disp('iii)  (TETA) is  = '+string (TETA) +'degree
      ');
```

Scilab code Exa 7.21 Ra Rb Rc

```
1                  //EXAMPLE 7-21      PG NO-481
2  Rb=0.05;
3  C=0.09;
4  Ra=1/[C-(Rb)];
5  disp('i) RESISTANCE  = '+string (Ra)+' ohm');
6  C1=0.07;
7  Rc=1/(C1-Rb);
8  disp('ii) RESISTANCE  = '+string (Rc)+' ohm');
```

Scilab code Exa 7.22 Z and Y Parameter

```
1                                  //EXAMPLE 7-22      PG NO
                                      -482
2  Z11=4;
3  Z21=3;
4  Z12=3;
5  Z22=5;
6  Z=[Z11 Z12;Z21 Z22];
7  X=det(Z);
8  disp(' delta is  = '+string(X)+'');
9  Y=[(Z22/X) (-Z12/X);(-Z21/X) (Z11/X)];
10 disp(' ADMITTANCE is  = '+string(Y)+'');
```

Scilab code Exa 7.25 matrix

```
1                                   //EXAMPLE 7_25                PG
                                        NO-484-485
2  A1=4/3;
3  A2=5/3;
4  B1=11/3;
5  B2=2;
6  C1=1/3;
7  C2=2;
8  D1=5/3;
9  D2=3;
10 A=A1+A2;
11 B=B1+B2;
12 C=C1+C2;
13 D=D1+D2;
14 X=(A*D)-(B*C);
15 disp(' X is    = '+string(X)+'');
16 Z=[A1 B1;C1 D1]*[A2 B2; C2 D2];
17 disp(' ABCD MATRIX is    = '+string(Z)+'');
```

Scilab code Exa 7.34 output Voltage

```
1                                   //EXAMPLE 7-34          PG NO
                                        -489-490
2  h21=0.98;
3  h22=0.3*10^-6;
4  I1=(h22+(1/10^4))/h21;
5  disp('i) Current (I1)    is      =   '+string (I1) +' A
       ');
```

Scilab code Exa 7.37 `Y parameter`

```
1                                   //EXAMPLE 7-37          PG NO
                                      438-439
2  Z11=3.25;
3  Z21=0.75;
4  Z12=-0.75;
5  Z22=1.75;
6  Z=[Z11 Z12;Z21 Z22];
7  X=det(Z);
8  disp(' delta is    = '+string(X)+'');
9  Y=[(Z22/X) (-Z12/X);(-Z21/X) (Z11/X)];
10 disp(' ADMITTANCE is    = '+string(Y)+'');
```

Scilab code Exa 7.38 `Impedance`

```
1                                       //EXAMPLE 7-38      PG NO
                                          -493
2  R1=4;                                  //RESISTANCE
3  R2=4;                                  //RESISTANCE
4  R3=8/9;                                  //RESISTANCE
5  Z10=[R1*(R3+R2)]/[R1+R2+R3];
6  disp(' Impedance is  (Z10)  = '+string(Z10)+'ohm');
7  Z20=[R1*(R3+R2)]/[R1+R2+R3];
8  disp(' Impedance is  (Z20)  = '+string(Z20)+'ohm');
9  Z1S=[R1*R3]/[R1+R3];
10 disp(' Impedance is (Z1S)  = '+string(Z1S)+'ohm');
11 Z2S=[R1*R3]/[R1+R3];
12 disp(' Impedance is (Z1S)  = '+string(Z2S)+'ohm');
```

Scilab code Exa 7.42 Z Parameter

```
1                                                    //EXAMPLE7-42  PG
                                                       NO-495-496
2  Z11=2/3;
3  Z22=Z11;
4  Z12=1/3;
5  Z21=Z12;
6  A=Z11/Z21;
7  disp(' A is (A)  = '+string(A)+'ohm');
8  Z=[Z11 Z12;Z21 Z22]
9  X=det(Z);
10 disp(' Determinent is (X)  = '+string(X)+'');
11 B=X/Z21;
12 disp(' B is (B)  = '+string(B)+'ohm');
13 C=1/Z21;
14 disp(' C is (C)  = '+string(C)+'mho');
15 D=Z22/Z21;
16 disp(' D is (D)  = '+string(D)+'mho');
```

Chapter 8

filter

Scilab code Exa 8.1 Frequency Impedance Attenuation Phase Shift

```
1                    //EXAMPLE  8-1       PG N0-510
2  L=0.02;                   //INDUCTANCE
3  C=4*10^-6;                //CAPACITOR
4  Z=200;
5  Fc=1/(%pi*(L*C)^0.5);
6  Z0=(L/C)^0.5;
7  Z1=(%i*2)*%pi*Z*L;
8  Z2=1/(%i*2*%pi*Z*C);
9  Z0*(%pi)=[(4*Z1*Z2*Z2)/(Z1+4*Z2)]^0.5
10 F1=2000;
11 Z11=%i*%pi*F1*L;
12 Z22=1/(%i*%pi*F1*C);
13 Z01=[(4*Z11*Z22*Z22)/(Z1+4*Z22)]^0.5;
14 disp('ii) POWER (Pmax) is     =  '+string ([Z1]) +'
     W ');
15 disp('ii) POWER (Pmax) is     =  '+string ([Z2]) +'
     W ');
16 disp('ii) POWER (Pmax) is     =  '+string ([Z0*(%pi)
     ]) +'  W ');
17 disp('ii) POWER (Pmax) is     =  '+string ([Z11]) +'
      W ');
```

```
18 disp('ii) POWER (Pmax) is     =  '+string ([Z22]) +'
     W ');
19 disp('ii) POWER (Pmax) is     =  '+string ([Z01]) +'
     W ');
```

Scilab code Exa 8.2 `L and C`

```
1              //example 8-2    pg no -511
2 Ro=600;
3 Fc=940;
4 L=Ro/(%pi*Fc);
5 C=1/(%pi*Ro*Fc);
6 disp('ii) INDUCTANCE (L) is     =  '+string ([L]) +'
     H ')
7 disp('ii) CAPACITOR (C) is     =  '+string ([C]) +'
    F ')
```

Scilab code Exa 8.3 `Impedance`

```
1 L=0.015;                    //INDUCTANCE
2 C=0.5*10^-6;                 //CAPACITOR
3 Z=200;
4 Fc=1/(4*%pi*(L*C)^0.5);
5 Z0=(L/C)^0.5;
6 Z2=(%i*2)*%pi*Z*L;
7 Z1=1/(%i*2*%pi*Z*C);
8 F1=2000;
9 Z01=[(Z1*Z2)/(1+(Z1/(4*Z2)))]^0.5;
10 A=8.147;
11 disp('ii) Impedance (ZO) is     =  '+string ([Z0]) +'
     W ');
12 disp('ii) FREQUENCY is     =  '+string ([Fc]) +'  HZ
    ');
```

```
13 disp('ii) Impedance(Z1) is     =  '+string ([Z1]) +'
     W ');
14 disp('ii) Impedance(Z2) is     =  '+string ([Z2]) +'
     W ');
15 disp('ii) Impedance(Z01) is     =  '+string ([Z01]) +
     '  W ');
16 disp('ii) ALPHA is     =  '+string ([A]) +'    ');
```

Scilab code Exa 8.4 `L and C`

```
1                    //EXAMPLE -8-4    PG NO-514-515
2 Ro=3000;
3 Fc=2000;
4 L=Ro/(4*%pi*Fc);
5 C=1/(4*%pi*Fc*Ro);
6 disp('i) INDUCTANCE (L) is     =  '+string ([L]) +'
    H ')
7 disp('ii) CAPACITOR (C) is     =  '+string ([C]) +'
    F ')
```

Scilab code Exa 8.5 `Band Width`

```
1                    //EXAMPLE 8-5    PG NO-517
2 C1=1;
3 C2=50;
4 X=1000;                  //X=1/(2*%pi*(L1*C1)^0.5)
5 Y=X*2*(C1/C2)^0.5;                  //Y=(Fc2-Fc1)
6 disp('ii) Frequency (Fc2-Fc1) is     =  '+string ([Y
    ]) +'  Hz ')
```

Scilab code Exa 8.6 Circuits Parameter

```
1                                   //EXAMPLE 8-7  PG NO-519
2 Ro=100;
3 Fc2=5000;
4 Fc1=500;
5 L1=Ro/[2*%pi*(Fc2-Fc1)];
6 disp('ii) INDUCTANCE (L1/2) is    =  '+string ([L1
    /2]) +'  H ')
7 C1=(Fc2-Fc1)/(2*%pi*Ro*Fc1*Fc2)
8 disp('ii) CAPACITOR (2*C1) is     =  '+string ([2*C1
    ]) +'  F ')
9 L2=[Ro*(Fc2-Fc1)]/(4*%pi*Fc1*Fc2);
10 disp('ii) INDUCTANCE (L2) is     =  '+string ([L2]) +
    '  H ')
11 C2=1/(%pi*(Fc2-Fc1));
12 disp('ii) CAPACITOR (C2) is      =  '+string ([C2]) +'
     F ')
```

Scilab code Exa 8.7 inductance

```
1                   //EXAMPLE 8-7   PG NO-519
2 Fc1=1000;
3 Fc2=3000;
4 Ro=100;
5 L1=[(Ro*(Fc2-Fc1))/(2*%pi*Fc2*Fc1)]
6 disp('i) INDUCTANCE (L1/2) is     =  '+string ([L1])
    +'  H ')
7 C1=1/[2*%pi*(Fc2-Fc1)];
8 disp('ii) CAPACITOR (C1) is       =  '+string (C1) +'
    F ')
9 L2=Ro/[4*%pi*(Fc2-Fc1)];
10 disp('iii) INDUCTANCE (L2) is    =  '+string ([L2])
    +'  H ')
11 C2=(Fc2-Fc1)/(%pi*Ro*Fc1*Fc2)
```

```
12 disp('ii) CAPACITOR (C2) is     =  '+string ([C2]) +'
       F ')
```

Scilab code Exa 8.8 m

```
1                    // EXAMPLE 8-8    PG NO-523
2 Ro=600;
3 Fc=2500;
4 L=Ro/(%pi*Fc);
5 C=1/(%pi*Ro*Fc);
6 disp('i) INDUCTANCE (L) is     =  '+string ([L]) +'
     H ')
7 disp('ii) CAPACITOR (C) is     =  '+string ([C]) +'
     F ')
8 Fo=2600;
9 m=sqrt(1-(Fc/Fo)^2)
10 disp('iii)  (m) is     =  '+string (m) +'    ')
11 L1=[(1-m*m)/4*m]*L;
12 disp('iv) INDUCTANCE (L1) is     =  '+string ([L1]) +
     '  H ')
13 L2=0.5*m*L;
14 disp('ii) INDUCTANCE (L2) is     =  '+string ([L2]) +
     '  H ')
15 C1=m*C;
16 disp('ii) CAPACITOR (C1) is     =  '+string (C1) +'
     F ')
```

Scilab code Exa 8.9 m

```
1                    //EXAMPLE 8-9        PG NO-525
2 Ro=600;
3 Fc=3000;
4 L=Ro/(4*%pi*Fc);
```

```
5  disp('i) INDUCTANCE (L) is    =  '+string ([L]) +'
     H ')
6  C=1/(4*%pi*Fc*Ro);
7  disp('ii) CAPACITOR (C) is    =  '+string ([C]) +'
     F ')
8  Fo=2700;
9  m=sqrt(1-(Fo/Fc)^2);
10 disp('iii) (m) is    =  '+string ([m]) +'    ');
11 X=(2*C)/m;
12 disp('iv) X (X) is    =  '+string ([X]) +' F   ');
13 Y=L/m;
14 disp('v) Y    is    =  '+string ([Y]) +' H   ');
15 Z=(4*m*C)/(1-m^2);                                    //Z
     =4mC/1-m^2
16 disp('vi) Z   (Z) is    =  '+string ([Z]) +'  F ');
17 Z1=(4*m*L)/(1-m^2);                          //Z1=4mL/1-m^2
18 disp('vii)  (Z1) is    =  '+string ([Z1]) +' H   ')
19 X1=(2*L)/m;
20 disp('viii)  X1    (X1) is    =  '+string ([X1]) +'
     H   ')
21 Y1=C/m;
22 disp('ix) Y1  is    =  '+string ([Y1]) +' F   ')
```

Scilab code Exa 8.10 L and C

```
1     //EXAMPLE  8-10                PG NO- 529
2  Ro=100;
3  Fc=1000;
4  L=Ro/Fc*%pi;
5  disp('i) INDUCTANCE (L) is    =  '+string ([L]) +'
     H ')
6  C=1/(%pi*Ro*Fc)
7  disp('ii) CAPACITOR (C) is    =  '+string (C) +'  F
     ')
```

Scilab code Exa 8.11 L and C

```
1                //EXAMPLE  8-11      PG NO-529-530
2 Ro=500;
3 Fc=1000;
4 L=Ro/(%pi*Fc);
5 disp('ii) INDUCTANCE (L) is     =  '+string (L) +'  H
      ')
6 C=1/(%pi*Ro*Fc);
7 disp('ii) CAPACITOR (C) is     =  '+string (C) +'  F
     ')
```

Scilab code Exa 8.12 L

```
1                //EXAMPLE 8-12    PG NO-530
2 Fc=1000;
3 C=0.05*10^-6;
4 L=1/(%pi*%pi*Fc*Fc*C)
5 disp('i) INDUCTANCE (L) is     =  '+string ([L]) +'
    H ')
```

Scilab code Exa 8.13 C

```
1                //EXAMPLE 8-13      PG NO-530
2 Fc=2000;
3 L=0.05;
4 C=1/(16*%pi*%pi*Fc*Fc*L)
5 disp('i) CAPACITOR (C) is     =  '+string (C) +'  F  '
    )
```

Scilab code Exa 8.14 L and C

```
1           //EXAMPLE 8-14    PG NO-530
2 Ro=600;
3 Fc=20000;
4 L=Ro/(4*%pi*Fc);
5 C=1/(4*%pi*Ro*Fc);
6 disp('i) INDUCTANCE (L) is     =  '+string (L) +'  H
    ')
7 disp('ii) CAPACITOR (C) is     =  '+string (C) +'  F
    ')
```

Scilab code Exa 8.15 cutt off Frequency

```
1                   //EXAMPLE 8-15    PG NO-531
2 L=50*10^-3;
3 C=0.2*10^-6;
4 Ro=(L/C)^0.5;
5 Fc=1/[%pi*(L*C)^0.5];
6 disp('i) RESISTANCE (Ro) is     =  '+string (Ro) +'
    ohm ')
7 disp('ii) FREQUENCY (Fc) is     =  '+string (Fc) +'
    Hz ')
```

Scilab code Exa 8.16 Cutt off Frequency Pass band

```
1                       //EXAMPLE 8-16    PG NO-531
2 C=0.2*10^-6;
3 L=50*10^-3;
```

```
4 Ro=(L/C)^0.5;
5 Fc=1/[4*%pi*(L*C)];
6 disp('Hi) RESISTANCE (Ro) is     =  '+string (Ro) +'
      ohm ')
7 disp('Hi) FREQUENCY (Fc) is     =  '+string (Fc) +'
     Hz ')
```

Scilab code Exa 8.17 Cutt off Frequency Pass band

```
1                                          //EXAMPLE 8-18
                                             PG NO
                                           -533-534
2 Z1=%i*413.05;                           //Impedance
3 Z2=%i*334.45;                           //Impedance
4 Zoc=(Z1/2)-Z2;
5 disp('i)   Impedance(Zoc) is     =  '+string ([Zoc])
     +' ohm  ');
6 Zsc=(Z1/2)+[((Z1*-Z2)/2)/(-Z2+(Z1/2))];
7 disp('ii)  Impedance (Zsc) is    =  '+string ([Zsc])
      +' ohm  ');
8 Zo=(Zoc*Zsc)^0.5;
9 disp('ii)  Impedance (Zo) is     =  '+string ([Zo]) +
     ' ohm  ');
```

Scilab code Exa 8.18 m

```
1                  //EXAMPLE 8-18    PG NO-533
2 Ro=600;
3 Fc=1000;
4 L1=Ro/(%pi*Fc);
5 C2=1/(%pi*Ro*Fc);
6 Fo=1050;
7 m=[1-(Fc/Fo)]^0.5;
```

```
X=(0.5*m*L1);
Y=[(1-m*m)/4*m]*L1;
Z=m*C2;
A=(m*L1)/2;
B=[(1-m*m)/(2*m)]*L1;
C=(m*C2)/2;
disp('i) INDUCTAR (L1) is     =  '+string (L1) +'  H
    ')
disp('ii) CAPACITOR (C2) is     =  '+string (C2) +'
   F ')
disp('iii) CONSTANT (m) is     =  '+string (m') +'
    ')
disp('iv)    (X) is     =  '+string (X) +'  H ')
disp('v)     (y) is     =  '+string (Y) +'  H ')
disp('vi)    (Z) is     =  '+string (Z) +'  F ')
disp('vii)   (A) is     =  '+string (A) +'  H ')
disp('viii) (B) is     =  '+string (B) +'  H ')
disp('x)     (C) is     =  '+string (C) +'  F ')
```

Scilab code Exa 8.19 m and T

```
                                //EXAMPLE 8-19
                                        PG NO
                                   -534-535
Ro=600;                          //characteristics
   Impedance
Fc=1000;                         //cutt    of
   frequency
L=Ro/(4*%pi*Fc);
disp('i) Inductance is     =  '+string ([L]) +'  H ')
   ;
C=1/[4*%pi*Fc*Ro];
disp('ii) Capacitance is     =  '+string ([C]) +'  F
   ');
m=0.2;
```

```
X=(2*C)/m;                              //X=2C/m;
disp('iii) X is     =  '+string ([X]) +'  F ');
Y=L/m;                                  Y=L/m;
disp('iv)  Y is     =  '+string ([Y]) +'  H ');
Z=(4*m*C)/[1-m^2];
disp('v) Z    is    =  '+string ([Z]) +'  F ');
m1=0.6;
X1=(2*C)/m1;                              //X=2C/m;
disp('iii) X is     =  '+string ([X1]) +'  F ');
Y1=(2*L)/m1;                                Y1=L/m1;
disp('iv)  Y is     =  '+string ([Y1]) +'  H ');
Z1=(2*m1*C)/[1-m1^2];
disp('v) Z    is    =  '+string ([Z1]) +'  F ');
```

Scilab code Exa 8.20 impedance

```
                    //EXAMPLE 8-20    PG NO-535
Ro=450;
Fc=20000;
L=Ro/(4*%pi*Fc);
C=1/(4*%pi*Fc*Ro);
Z1=Ro/(2*%pi*Fc);
disp('i) IMPEDANCE (Z1) is    =  '+string (Z1) +' ');
```

Scilab code Exa 8.21 Inductance Capacitance

```
                    //EXAMPLE 8-21    PG NO-536-537
Ro=600;                             //RESISTANCE
Fc=10000;                           //FREQUENCY
F=25000;
L=Ro/(4*%pi*Fc);
C=1/(4*%pi*Fc*Ro);
Z=Ro*[1-(Fc/F)^2]^0.5;
```

```
8  Zo=Ro/[1-(Fc/F)^2]^0.5;
9  disp('i) INDUCTAR (L) is     =  '+string (L) +'  H ')
10 disp('ii) CAPACITOR (C) is    =  '+string (C) +'  F
       ')
11 disp('i) IMPEDANCE (Z) is     =  '+string (Z) +'  ohm
       ')
12 disp('ii) IMPEDANCE (Zo) is    =  '+string (Zo) +'
       ohm ')
```

Scilab code Exa 8.22 Resonant Frequency Band Width Cutt off Frequency

```
1                  //EXAMPLE 8-22          PG NO-537-538
2  L=60*10^-3;
3  C=150*10^-9;
4  Fo=1/[2*%pi*(L*C)^0.5];
5  disp('ii) FREQUENCY (Fo) is     =  '+string (Fo) +'
       Hz ')
6  R=670;
7  B.W=R/L;
8  disp('ii) BAND WIDTH (B.W) is     =  '+string (B.W) +
       '  rad/sec ')
9  FL=Fo-(1777.22/2);
10 disp('ii) Lower Cut of Frequency (FL) is     =  '+
       string (FL) +'  Hz ')
11 Fu=Fo+(1777.22/2);
12 disp('ii) Upper Cut of Frequency (Fu) is     =  '+
       string (Fu) +'  Hz ')
```

Scilab code Exa 8.23 Cutt off Frequency

```
1                        //EXAMPLE 8-23      PG NO-538
2  L=160*10^-3;
3  C=0.022*10^-6;
```

```
4 Fc=1/[%pi*(L*C)^0.5];
5 Zo=(L/C)^0.5;
6 disp('ii) Cut of Frequency (Fc) is    = '+string (
    Fc) +'  Hz ')
7 disp('ii) IMPEDANCE (Zo) is    = '+string (Zo) +'
    ohm ')
```

Scilab code Exa 8.24 Output Voltage

```
1                          //EXAMPLE 8-24    PG NO-541-542
2 Avf=1.56
3 Vo=2.262*10^-3;
4 R=15*10^3;
5 F=0.707;
6 C=0.002*10^-6;
7 Fc=1/(2*%pi*R*C);
8 disp('ii) Cut of Frequency (Fc) is    = '+string (
    Fc) +'  Hz ')
9 Vo1=F*Vo;
10 A=20*log(1.56);
11 disp('ii) Out Put Voltage (Vo1) is    = '+string (
    Vo1) +'  V ')
```

Scilab code Exa 8.25 Gain

```
1                          //EXAMPLE 8-25    PG NO-542
2 Fc=4000;
3 R=10*10^3;
4 C=1/[2*%pi*Fc*R];
5 disp('i) CAPACITOR (C) is    = '+string (C) +'  F '
    )
6 Avf=1.586;
7 R1=15000
```

```
8 R2=[Avf-1]*R1;
9 disp('ii) RESISTANCE (R2) is = '+string (R2) +'
    ohm ')
```

Scilab code Exa 8.26 Mid Band Gain

```
1 //EXAMPLE-8-26 PG NO-543
2 R=15.86;
3 R1=10;
4 MA=R/R1;
5 disp('i) mid band gain = '+string (MA)+' ');
```

Scilab code Exa 8.27 R2 Mid abnd Gain Cutt of Frequency

```
1 //EXAMPLE 8-27 PG NO-545
2 R2=0.586;
3 M.G=1+0.586; //MID BAND GAIN
4 R=10^3;
5 C=0.02*10^-6;
6 Fc=1/(2*%pi*R*C); //Cut OFF
    Frequency
7 G.Fc=0.707*M.G;
8 M.B.O=M.G*1.4;
9 disp('ii) Cut off Frequency (Fc) is = '+string
    (Fc) +' ')
10 disp('ii) Gain at cutt of frequency (G.Fc) is =
    '+string (G.Fc) +' ')
11 disp('ii) Mid band out Put (M.B.O) is = '+string
    (M.B.O) +' mV ')
```

Scilab code Exa 8.28 Mid abnd Output

```
1                                   //EXAMPLE-8-28          PG NO
                                      -545-546
2  Avf=1.586;
3  R1=10;
4  R2=[Avf-1]*R1;
5  Fc=5000;
6  R=2000;
7  C=1/[2*%pi*R*Fc]
8  disp('ii) Resistance (R2) is    =  '+string (R2) +'
       Kohm ')
9  disp('ii) CAPACITOR (C) is    =  '+string (C) +'  F
       ')
```

Scilab code Exa 8.29 Gain at mid band

```
1                        //EXAMPLE 8-29      PG NO-547-548
2  R1=10000;
3  Fc1=8000;
4  C1=1/[2*%pi*R1*Fc1];
5  R4=15;
6  R3=8.79;
7  Fc2=4000;
8  R2=20000;
9  C2=1/[2*%pi*R2*Fc2];
10 disp('ii) CAPACITOR (C1) is    =  '+string (C1) +'
      F ')
11 disp('ii) CAPACITOR (C2) is    =  '+string (C2) +'
      F ')
```

Scilab code Exa 8.30 Design a Filter

```
1                                   //EXAMPLE 8-30      PG NO-548
2 R1=10000;
3 Fc1=40000 ;
4 C1=1/[R1*Fc1*2*%pi];
5 disp('ii) CAPACITOR (C1) is     =  '+string (C1) +'
    F ');
6 Fc2=8000;
7 R2=5000;
8 C2=1/[R2*Fc2*2*%pi];
9 disp('ii) CAPACITOR (C2) is     =  '+string (C2) +'
    F ');
```

Scilab code Exa 8.31 Resistance

```
1                          //EXAMPLE 8-31      PG NO-550
2 N=100;
3 Ro=450;
4 R1=Ro*[(N-1)/(N+1)];
5 R2=Ro*[2*N/{N^2-1}];
6 disp('ii) Resistance (R1) is     =  '+string (R1) +'
    ohm ');
7 disp('ii) Resistance(r2) is     =  '+string (R2) +'
    ohm ');
```

Scilab code Exa 8.32 Impedance

```
1                                   //EXAMPLE 8-32      PG NO-550
2 Zoc=200;
3 Zsc=187.5;
4 Zo=[Zoc*Zsc]^0.5;
5 R1=50;
6 R2=150;
7 R3=193.65;
```

```
8  N=[R1+R2+R3]/R1;
9  D=20*log10(N)
10 disp('ii) IMPEDANCE (Zo) is     =  '+string (Zo) +'
       ohm ');
11 disp('ii)  (N) is     =  '+string (N) +'    ');
12 disp('ii)  (D) is     =  '+string (D) +'  dB ');
```

Scilab code Exa 8.33 Attenuation

```
1                    //EXAMPLE 8-34        PG NO-551
2  N=2.985;
3  Ro=175;
4  R1=Ro*[(N-1)/(N+1)];
5  R2=Ro*[(2*N)/(N^2-1)];
6  disp('ii) Resistance (R1) is     =  '+string (R1) +'
       ohm ');
7  disp('ii) Resistance (R2) is     =  '+string (R2) +'
       ohm ');
```

Scilab code Exa 8.34 Resistance

```
1                    //EXAMPLE 8-34        PG NO-551
2  N=2.985;
3  Ro=175;
4  R1=Ro*[(N-1)/(N+1)];
5  R2=Ro*[(2*N)/(N^2-1)];
6  disp('ii) Resistance (R1) is     =  '+string (R1) +'
       ohm ');
7  disp('ii) Resistance (R2) is     =  '+string (R2) +'
       ohm ');
```

Scilab code Exa 8.35 Impedance

```
1                    //EXAMPLE 8-35     PG NO-552
2 R1=200;
3 R2=200;
4 R3=100;
5 Zoc=[R1*(R2+R3)/(R1+R2+R3)];
6 disp('i) IMPEDANCE (Zoc) is     =  '+string (Zoc) +'
      ohm ');
7 Zsc=(R1*R3)/(R1+R3);
8 disp('ii) IMPEDANCE (Zsc) is     =  '+string (Zsc) +'
      ohm ');
9 Zo=[Zoc*Zsc]^0.5;
10 disp('iii) IMPEDANCE (Zo) is     =  '+string (Zo) +'
      ohm ');
11 N=2.618;
12 D=20*log10(N)
13 disp('ii) (D) is     =  '+string (D) +'  dB ');
```

Scilab code Exa 8.36 Resistance

```
1                    //EXAMPLE 8-36    PG NO-552-553
2 N=31.622;
3 Ro=700;
4 R1=Ro*[(N^2-1)/(2*N)];
5 R2=Ro*[(N+1)/(N-1)];
6 disp('i) RESISTANCE (R1) is     =  '+string (R1) +'
    ohm ');
7 disp('ii) RESISTANCE (R2) is     =  '+string (R2) +'
      ohms ');
```

Scilab code Exa 8.37 Impedance

```
1                    //EXAMPLE 8-37        PG NO-553
2 R1=657.08;
3 R2=44.316;
4 Zoc=R1+R2;
5 Zsc=R1+[(R1*R2)/(R1+R2)];
6 Zo=[Zoc*Zsc]^0.5;
7 N=[R2+R1+Zo]/R2;
8 disp('i)    impedance (Zoc) is    =  '+string (Zoc)
    +'  ohm ');
9 disp('ii) impedance (Zsc) is    =  '+string (Zsc) +'
     ohm ');
10 disp('iii)impedance (Zo) is    =  '+string (Zo) +'
    ohm ');
11 disp('iv) (N) is    =  '+string (N) +'   ');
```

Scilab code Exa 8.38 Resistance

```
1                  //EXAMPLE 8-38     PG NO-554
2 N=5.6234;
3 Ro=450;
4 R1=Ro*[(N^2-1)/(2*N)];
5 R2=Ro*[(N+1)/(N-1)];
6 disp('i) RESISTANCE (R1) is    =  '+string (R1) +'
    ohm ');
7 disp('ii) RESISTANCE (R2) is    =  '+string (R2) +'
     ohm ');
```

Scilab code Exa 8.39 N

```
1                    //EXAMPLE 8-39        PG NO-554
2 R1=250;
3 R2=750;
4 Zoc=[R1*(R1+R2)]/{R1+R2+R1};
```

```
5 Zsc=[(R1*R2)/(R1+R2)];
6 Zo=[Zoc*Zsc]^0.5;
7 disp('i)    impedance (Zoc) is    =  '+string (Zoc)
    +'  ohm ');
8 disp('ii) impedance (Zsc) is    =  '+string (Zsc) +'
     ohm ');
9 disp('iii)impedance (Zo) is    =  '+string (Zo) +'
    ohm ');
```

Scilab code Exa 8.40 N

```
1                    //EXAMPLE 8-40  PG NO-554-555
2 R1=459.089;
3 R2=22500';
4 Zoc=[R1*(R1+R2)]/{R1+R2+R1};
5 Zsc=[(R1*R2)/(R1+R2)];
6 Zo=[Zoc*Zsc]^0.5;
7 disp('i)    impedance (Zoc) is    =  '+string (Zoc)
    +'  ohm ');
8 disp('ii) impedance (Zsc) is    =  '+string (Zsc) +'
     ohm ');
9 disp('iii)impedance (Zo) is    =  '+string (Zo) +'
    ohm ');
```

Scilab code Exa 8.41 L

```
1                  //EXAMPLE 8-41   PG NO-557
2 N=7.943;
3 Z=300;            //IMPEDANCE
4 R1=[(N-1)/N]*Z;
5 R2=Z/(N-1);
6 disp('i)   RESISTANCE (R1) is    =  '+string (R1) +'
     ohm ');
```

```
7 disp('ii)    RESISTANCE (R2) is     =   '+string (R2) +
    '  ohm  ');
```

Scilab code Exa 8.42 D

```
1                          //EXAMPLE 8-43    PG NO-557
2 Z1=450;
3 Z2=300;
4 R1=[Z1*(Z1-Z2)]^0.5;
5 R2=[(Z1*Z2*Z2)/(Z1-Z2)]^0.5;
6 disp('ii)    RESISTANCE (R1) is     =   '+string (R1) +
    '  ohm  ');
7 disp('ii)    RESISTANCE (R2) is     =   '+string (R2) +
    '  ohm  ');
```

Scilab code Exa 8.43 L

```
1                          //EXAMPLE 8-43    PG NO-557
2 Z1=450;
3 Z2=300;
4 R1=[Z1*(Z1-Z2)]^0.5;
5 R2=[(Z1*Z2*Z2)/(Z1-Z2)]^0.5;
6 disp('ii)    RESISTANCE (R1) is     =   '+string (R1) +
    '  ohm  ');
7 disp('ii)    RESISTANCE (R2) is     =   '+string (R2) +
    '  ohm  ');
```

Scilab code Exa 8.45 design T

```
1                          //EXAMPLE 8-45 PG NO-559-560
```

```
2 N=5.6234;
3 R1=500;
4 R2=R1/(N-1);
5 R3=R1*(N-1);
6 disp('i)   RESISTANCE (R2) is    =  '+string (R2) +'
      ohm ');
7 disp('ii)   RESISTANCE (R3) is    =  '+string (R3) +
    '  ohm ');
```

Scilab code Exa 8.46 Design lattice attenuator

```
1                          //EXAMPLE 8-46      PG NO-560-561
2 N=7.0795;
3 Z1=450;
4 R1=Z1*[(N-1)/(N+1)];
5 R2=Z1*[(N+1)/(N-1)];
6 disp('ii)   RESISTANCE (R1) is    =  '+string (R1) +
    '  ohm ');
7 disp('ii)   RESISTANCE (R2) is    =  '+string (R2) +
    '  ohm ');
```

Scilab code Exa 8.47 Impedance

```
1                    //EXAMPLE 8-47     PG  NO-561
2 R1=175;
3 R2=350;
4 Zoc=R1+R2;
5 Zsc=R1+[(R1*R2)/(R1+R2)];
6 Zo=[Zoc*Zsc]^0.5;
7 N=[R1+R2+Zo]/R2;
8 AT=20*log10(2.618);
9 disp('i)    impedance (Zoc) is    =  '+string (Zoc)
   +'  ohm ');
```

```
10 disp('ii) impedance (Zsc) is    =  '+string (Zsc) +'
       ohm ');
11 disp('iii)impedance (Zo) is    =  '+string (Zo) +'
     ohm ');
12 disp('iv)   (N) is    =  '+string (N) +'    ')
13 disp('v)attenuation (AT) is    =  '+string (AT) +'
     dB ')
```

Scilab code Exa 8.48 Resistance

```
1                                  //EXAMPLE  8-48   PG NO-561
2 R=300;
3 N=31.62;
4 R1=[(N-1)/N]*R;
5 R2=R/(N-1);
6 disp('i)   RESISTANCE (R1) is    =  '+string (R1) +'
       ohm ');
7 disp('ii)   RESISTANCE (R2) is    =  '+string (R2) +
     '  ohm ');
```

Scilab code Exa 8.49 Design lattice attenuator

```
1                        //EXAMPLE 8-49   PG NO-562
2 Ro=500;
3 N=10;
4 RA=Ro*[(N-1)/(N+1)];
5 RB=Ro*[(N+1)/(N-1)];
6 R1=Ro*[(N-1)/(N+1)];
7 R2=Ro*[(2*N)/(N^2-1)];
8 disp('ii)   RESISTANCE (RA) is    =  '+string (RA) +
     '  ohm ');
9 disp('ii)   RESISTANCE (RB) is    =  '+string (RB) +
     '  ohm ');
```

```
10 disp('ii)    RESISTANCE (R1) is     =   '+string (R1) +
     '  ohm  ');
11 disp('ii)    RESISTANCE (R2) is     =   '+string (R2) +
     '  ohm  ');
```

Chapter 9

Network Function

Scilab code Exa 9.24 Resonant frequency Q band width Impedance

```
1                                          //EXAMPLE 9-24
                                             PG NO-608-609
2  L=20;                                    //INDUCTANCE
3  R=2*L;                                   //RESISTANCE
4  disp('i) Resistance (R) is = '+string ([R]) +'
       ohm ');
5  Wo=sqrt(101);
6  disp('ii) Wo (Wo) is = '+string ([Wo]) +' rad/
       sec ');
7  Q=(Wo*L)/R;
8  disp('iii) Q is = '+string ([Q]) +' ');
9  BW=Wo/Q;
10 disp('iv) BANDWIDTH (BW) is = '+string ([BW]) +'
       rad/sec ');
```

Scilab code Exa 9.26 Resonant frequency Q

```
1                                          //EXAMPLE 9-26
```

```
                                                    PG NO
                                                -609-610
C=10^-6;
X=5*10^6;
L=1/(C*X);
disp('i) INDUCTAR (L) is     =  '+string ([L]) +' H
    ');
R=10*L;
disp('ii) Resistance (R) is     =  '+string ([R]) +'
    ohm  ');
W=2.236*10^3;
Q=(W*L)/R;
disp('iii) (Q) is     =  '+string ([Q]) +'    ');
BW=W/Q;
disp('iv) Band Width (BW) is     =  '+string ([BW]) +
    ' rad/sec  ');
```

Scilab code Exa 9.32 Q

```
                                    //Example 9-32          PG
                                        NO 618-619
P1=1-%i*50;
P2=1+%i*150;
Z1=0+%i*50;
I=[0.2*Z1]/[P1*P2];
disp('i) Current (I) is     =  '+string ([I]) +' A  '
    );
L=5;                                        //INDUCTAR
R=10;                                      //RESISTANCE
C=2*10^-5;
Wo=1/sqrt(L*C);
disp('ii) Wo (Wo) is     =  '+string ([Wo]) +' rad/
    sec  ');
Q=(Wo*L)/R;
disp('iii) Q (Q) is     =  '+string ([Q]) +'    ');
```

```
14 BW=Wo/Q;
15 disp('ii) Band Width (BW) is    =  '+string ([BW]) +
    ' rad/sec  ');
```

Scilab code Exa 9.37 Poles and Zero

```
1                                   //EXAMPLE 9-37
                                        PG NO
                                      623-624
2 C=1/8.5;                                  //
    Capacitor
3 L=1/(17*C);                              //Inductar
4 disp('ii) Inductar (L) is    =  '+string ([L]) +' H
    ');
5 R=2*L;                                  //Resistance
6 disp('ii) Resistance (R) is    =  '+string ([R]) +'
    ohm  ');
```

Scilab code Exa 9.38 R L G C

```
1                              //EXAMPLE 9-38   PG NO
                                 =624-625
2 C=1/9;                     //CAPACITOR
3 X=2;                   //R/L=X
4 Y=6-X;                  //G/C
5 G=4*C;
6 disp('i) G (G)   =  '+string (G)+' ohm')
7 L=0.9;
8 R=1.8;
```

Scilab code Exa 9.46 Ia

```
1                                   //EXAMPLE 9-46
                                                PG NO
                                      630-631
2 ZA=5+%i*3;
3 YA=1/ZA;
4 disp('ii) Admittance (YA) is     =  '+string ([YA]) +
    ' siemens  ');
5 V=100;                                //VOLTAGE
6 IA=V*YA;
7 disp('ii) Current (IA) is     =  '+string ([IA]) +' A
     ');
```

Scilab code Exa 9.50 Current

```
1                    //EXAMPLE 9-50                PG NO-632
2 I1=17.39-%i*4.66;              //CURRENT
3 I2=9+%i*15.68;                //CURRENT
4 I3=-%i*10.95;                 //CURRENT
5 I=I1+I2+I3;
6 disp('i)CURRENT (I)    =  '+string (I)+' A')
```

Scilab code Exa 9.56 C

```
1                    //example 9-56    pg no-636
2 Z1=8.05+%i*2.156;                  //IMPEDANCE
3 XL=2.155;
4 W=5000;
5 L=XL/W;
6 disp('i)INDUCTANCE (L)    =  '+string (L)+' H')
7 Z2=4.166-%i*7.216;                //IMPEDANCE
8 Xc=7.216;
```

```
C=1/[W*Xc];
disp('ii)CAPACITOR (C)    =   '+string (C)+' F')
D=11.708;                  //DIAMETER
XL1=12.81;
L1=XL1/W;
disp('i) INDUCTANCE (L1)    =   '+string (L1)+' H')
```