```
clc;
display('PER UNIT COMPUTATION OF POWER SYSTEM COMPONENTS');
k=input('Enter the Number of Elements:');
mvab=input('Enter the Base MVA:');
kvb=input('Enter the base KV:');
pu=zeros(k);
for i=1:1:k
  ch=input('Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line');
  switch(ch)
    case 1
      mva=input('Enter the MVA of Generator:');
      kv=input ('Enter the KV of Generator:');
      x=input('Enter the Sub-Transiant Reactance of Generator:');
      pu(i)=x*(kv/kvb)*(kv/kvb)*(mvab/mva);
    case 2
      t=input('Enter the type of Transformer: 1.Step Up Transformer 2.Distribution Transformer');
      if (t==1)
      mva=input('Enter the MVA of Transformer:');
      hkv=input ('Enter the HV side KV of Transformer:');
      lkv=input ('Enter the LV side KV of Transformer:');
      x=input('Enter the Sub-Transiant Reactance of Transformer:');
      kvbn=(hkv/lkv)*kvb
      pu(i)=x*(lkv/kvb)*(lkv/kvb)*(mvab/mva);
      end
      if(t==2)
      mva=input('Enter the MVA of Transformer:');
      hkv=input ('Enter the HV side KV of Transformer:');
      lkv=input ('Enter the LV side KV of Transformer:');
      x=input('Enter the Sub-Transiant Reactance of Transformer:');
      k=lkv/hkv;
      kvbn=k*kvbn;
      pu(i)=x*(lkv/kvbn)*(lkv/kvbn)*(mvab/mva);
      end
    case 3
      mva=input('Enter the MVA of Load:');
      kv=input ('Enter the KV of Load:');
      x=input('Enter the Sub-Transiant Reactance of Load:');
      pu(i)=x*(kv/kvbn)*(kv/kvbn)*(mvab/mva);
    case 4
      kv=input ('Enter the KV of Line:');
      x=input('Enter the Sub-Transiant Reactance of Line:');
      pu(i)=x/(kvbn*kvbn/mvab);
    otherwise
      disp('Enter the correct Choice');
  end
end
pu
```

OUTPUT:

```
PER UNIT COMPUTATION OF POWER SYSTEM COMPONENTS
Enter the Number of Elements:6
Enter the Base MVA:300
Enter the base KV:20
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line1
Enter the MVA of Generator:300
Enter the KV of Generator:20
Enter the Sub-Transiant Reactance of Generator:0.2
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line2
Enter the type of Transformer: 1.Step Up Transformer 2.Distribution Transformer1
Enter the MVA of Transformer:350
Enter the HV side KV of Transformer:230
Enter the LV side KV of Transformer:20
Enter the Sub-Transiant Reactance of Transformer:.1
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line4
Enter the KV of Line:230
Enter the HV side KV of Step up Transformer:230
Enter the LV side KV of Step up Transformer:20
Enter the Sub-Transiant Reactance of Line:32
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line2
Enter the type of Transformer: 1.Step Up Transformer 2.Distribution Transformer2
Enter the MVA of Transformer:300
Enter the HV side KV of Transformer:230
Enter the LV side KV of Transformer:13.2
Enter the Sub-Transiant Reactance of Transformer:0.1
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line3
Enter the MVA of Load:200
Enter the KV of Load:13.2
Enter the Sub-Transiant Reactance of Load:.2
Enter the Component 1.Generator 2.Transformer 3.Load 4.Transmission Line3
Enter the MVA of Load:100
Enter the KV of Load:13.2
Enter the Sub-Transiant Reactance of Load:.2
pu =

    0.2000
    0.0857
    0.1815
    0.0915
    0.2745
    0.5491
```

```
clc;
display('SYMMETRICAL FAULT ANALYSIS');
nb=input('Enter the number of buses:');
nl=input('Enter the number of lines:');
for i=1:1:nl
                sb(i)=input('Enter the Starting bus number:');
                eb(i)=input('Enter the Ending bus number:');
                z(i)=input('Enter the impedence Value:');
                shy(i)=input('Enter the halfline charging admitance:');
end
y=zeros(nb,nb);
for i=1:1:nl
              sy(i)=1/z(i);
              l=sb(i);
              m=eb(i);
              y(l,l)=y(l,l)+sy(i)+shy(i);
              y(m,m)=y(m,m)+sy(i)+shy(i);
              y(l,m)=y(l,m)-sy(i);
              y(m,l)=y(m,l)-sy(i);
end
y

n=input('Enter the number of Impedence to be added:');
for i=1:1:n
          b=input('Enter the bus number:');
          az=input('Enter the impedence Value:');
          y(b,b)=y(b,b)+(1/az);
end

y
zb=inv(y);
zb
k=input('Enter the faulted Bus Number');
ifault=1/zb(k,k);
vf=zeros(nb);
for i=1:1:nb
   vf(i)=(1-zb(i,k)/zb(k,k));
end
vf(k)=0;
vf
for l=1:1:(nb)
   for m=1:1:(nb)
   ist(l,m)=(vf(l)-vf(m))/zb(l,m);
   end
end
ist
```

OUTPUT:

```
SYMMETRICAL FAULT ANALYSIS
Enter the number of buses:3
Enter the number of lines:3
Enter the Starting bus number:1
Enter the Ending bus number:2
Enter the impedence Value:0.13j
Enter the halfline charging admitance:0
Enter the Starting bus number:1
Enter the Ending bus number:3
Enter the impedence Value:0.08j
Enter the halfline charging admitance:0
Enter the Starting bus number:2
Enter the Ending bus number:3
Enter the impedence Value:0.03j
Enter the halfline charging admitance:0
y =
   0.0000 -20.1923i   0.0000 + 7.6923i   0.0000 +12.5000i
   0.0000 + 7.6923i   0.0000 -41.0256i   0.0000 +33.3333i
   0.0000 +12.5000i   0.0000 +33.3333i   0.0000 -45.8333i
Enter the number of Impedence to be added:2
Enter the bus number:1
Enter the impedence Value:0.25j
Enter the bus number:2
Enter the impedence Value:0.2j
y =
   0.0000 -24.1923i   0.0000 + 7.6923i   0.0000 +12.5000i
   0.0000 + 7.6923i   0.0000 -46.0256i   0.0000 +33.3333i
   0.0000 +12.5000i   0.0000 +33.3333i   0.0000 -45.8333i
zb =
   0.0000 + 0.1274i   0.0000 + 0.0981i   0.0000 + 0.1061i
   0.0000 + 0.0981i   0.0000 + 0.1215i   0.0000 + 0.1151i
   0.0000 + 0.1061i   0.0000 + 0.1151i   0.0000 + 0.1345i
Enter the faulted Bus Number3
vf =
    0.2111
    0.1439
         0
ist=
   -0.6889i
   -1.9999i
   -1.2434i
```

```
clc;
display('Y-BUS Formation By Singular Transformation  Method');
nb=input('Enter the number of Buses:');
nl=input('Enter the number of Elements:');
a=zeros(nb,nl);
zp=zeros(nl,nl);
yp=zeros(nl,nl);
yb=zeros(nb,nb);
for i=1:nl
   l=input('Enter the line number:');
   sb(i)=input('Enter the starting Bus number:');
   if sb(i)>0
      a(sb(i),i)=1;
   end
   se(i)=input('Enter the Ending Bus number:');
   if se(i)>0
      a(se(i),i)=-1;
   end
   zp(l,l)=input('Enter the series impedence');
   yp(l,l)=inv(zp(l,l));
end
a
coupling=input('Is the line Mutually Coupled? yes=1 no=0; Enter your Option:');
if (coupling==1)
   k=input('Enter the number of coupling to be added');
   for i=1:k
      l=input('Enter the starting Line number');
      m=input('Enter the Ending Line number');
      z=input('Enter the coupling Impedence');
      yp(l,m)=1/z;
      yp(m,l)=yp(l,m);
   end
end
yb=a*yp*a';
yb
```

OUTPUT:

```
Y-BUS Formation By Singular Transformation Method
Enter the number of Buses:3
Enter the number of Elements:5
Enter the line number:1
Enter the starting Bus number:1
Enter the Ending Bus number:0
Enter the series impedence0.2j
Enter the line number:2
Enter the starting Bus number:1
Enter the Ending Bus number:2
Enter the series impedence0.3j
Enter the line number:3
Enter the starting Bus number:3
Enter the Ending Bus number:1
Enter the series impedence0.3j
Enter the line number:4
Enter the starting Bus number:2
Enter the Ending Bus number:3
Enter the series impedence0.5j
Enter the line number:5
Enter the starting Bus number:2
Enter the Ending Bus number:0
Enter the series impedence0.4j
a =
     1     1    -1     0     0
     0    -1     0     1     1
     0     0     1    -1     0
Is the line Mutually Coupled? yes=1 no=0; Enter your Option:1
Enter the number of coupling to be added2
Enter the starting Line number1
Enter the Ending Line number3
Enter the coupling Impedence0.6j
Enter the starting Line number5
Enter the Ending Line number4
Enter the coupling Impedence0.8j
yb =
   0.0000 - 8.3333i   0.0000 + 3.3333i   0.0000 + 1.6667i
   0.0000 + 3.3333i   0.0000 -10.3333i   0.0000 + 3.2500i
   0.0000 + 1.6667i   0.0000 + 3.2500i   0.0000 - 5.3333i
```

```
clc;
display('CALCULATION OF Y-BUS MATRIX BY Gaussian Elimination Method');
nb=input('Enter the number of buses:');
nl=input('Enter the number of lines:');
for i=1:1:nl
      sb(i)=input('Enter the Starting bus number:');
      eb(i)=input('Enter the Ending bus number:');
      z(i)=input('Enter the impedence Value:');
      shz(i)=input('Enter the halfline charging Impedence:');
end
y=zeros(nb,nb);
for i=1:1:nl
   sy(i)=1/z(i);
   shy(i)=1/shz(i);
   l=sb(i);
   m=eb(i);
   y(l,l)=y(l,l)+sy(i)+shy(i);
   y(m,m)=y(m,m)+sy(i)+shy(i);
   y(l,m)=y(l,m)-sy(i);
   y(m,l)=y(m,l)-sy(i);
end
y
k=input('Enter the bus to be Eliminated:');
for l=1:1:(nb)
   for m=1:1:(nb)
   y(l,m)=y(l,m)-(y(l,k)*y(k,m))/y(k,k);
   end
end
y(k,:)=[];
y(:,k)=[];
y
```

OUTPUT:

```
CALCULATION OF Y-BUS MATRIX BY Gaussian Elimination Method
Enter the number of buses:3
Enter the number of lines:3
Enter the Starting bus number:1
Enter the Ending bus number:2
Enter the impedence Value:0.05+0.25j
Enter the halfline charging Impedence:0.02j
Enter the Starting bus number:1
Enter the Ending bus number:3
Enter the impedence Value:0.03j
Enter the halfline charging Impedence:0.03j
Enter the Starting bus number:2
Enter the Ending bus number:3
Enter the impedence Value:0.04+0.22j
Enter the halfline charging Impedence:0.12j

y =

   1.0e+02 *

   0.0077 - 1.2051i  -0.0077 + 0.0385i   0.0000 + 0.3333i
  -0.0077 + 0.0385i   0.0157 - 0.6658i  -0.0080 + 0.0440i
   0.0000 + 0.3333i  -0.0080 + 0.0440i   0.0080 - 0.7940i

Enter the bus to be Eliminated:3

y =

   1.0e+02 *

   0.0091 - 1.0652i  -0.0109 + 0.0570i
  -0.0109 + 0.0570i   0.0148 - 0.6634i
```