MATLAB CODE:

```
clc;
clear all;
p(1)=input('Enter p1:');
p(2)=input('enter p2:');
p=[p(1);p(2)];
l12=input('Enter line reactance 1-2:');
l13=input('Enter line reactance 1-3:');
l23=input('Enter line reactance 2-3:');
b12=1/l12;b13=1/l13; b23=1/l23;
B=[b12+b13 -b12;-b12 b12+b23]
X=inv(B)
theta=X*p;
p12=(theta(1)-theta(2))*b12;
p13=theta(1)*b13;
p23=theta(2)*b23;
a121=(X(1,1)-X(2,1))*b12;
a131=X(1,1)*b13;
a231=X(2,1)*b23;
disp ('.....................................................');
disp ('For outage of generator 1:');
delp1=-p(1);
p12m=p12+a121*delp1;p23m=p23+a231*delp1;p13m=p13+a131*delp1;
disp ('Generator shift factor are:');
a121
a131
a231
disp ('Power flow during outage of generator 1');
fprintf('Power flow line 12 %g p.u.:\n',p12m);
fprintf('Power flow line 23 %g p.u.:\n',p23m);
fprintf('Power flow line 13 %g p.u.:\n',p13m);
disp ('.....................................................');
for i=1:3
X(i,3)=0;
end
% Line outage of distribution factor outage of 1-3
disp ('For outage of line 1-2');
disp ('Line Outage distribution factor are:');
d1312=((l12/l13)*(X(1,1)-X(1,2)-X(3,1)+X(3,2)))/(l12-(X(1,1)+X(2,2)-
2*X(1,2)))
d2312=((l12/l23)*(X(2,1)-X(2,2)-X(3,1)+X(3,2)))/(l12-(X(1,1)+X(2,2)-
2*X(1,2)))
f13=p13+d1312*p12; f23=p23+d2312*p12;
```

```
fprintf('Power flow line 13 %g p.u.:\n',f13);
fprintf('Power flow line 23 %g p.u.:\n',f23);
disp ('.....................................................');
% Line outage of distribution factor outage of 1-3
disp ('For outage of line 1-3');
disp ('Line Outage distribution factor are:');
d1213=((l13/l12)*(X(1,1)-X(1,3)-X(2,1)+X(2,3)))/(l13-(X(1,1)+X(3,3)-
2*X(1,3)))
d2313=((l13/l23)*(X(2,1)-X(2,3)-X(3,1)+X(3,3)))/(l13-(X(1,1)+X(3,3)-
2*X(1,3)))
f12=p12+d1213*p13
f23=p23+d2313*p13
fprintf('Power flow line 12 %g p.u.:\n',f12);
fprintf('Power flow line 23 %g p.u.:\n',f23);
disp ('.....................................................');
% Line outage of distribution factor outage of 2-3
disp ('For outage of line 2-3');
disp ('Line Outage distribution factor are:');
d1223=((l23/l12)*(X(1,2)-X(1,3)-X(2,2)+X(2,3)))/(l23-(X(2,2)+X(3,3)-
2*X(2,3)))
d1323=((l23/l13)*(X(1,2)-X(1,3)-X(3,2)+X(3,3)))/(l23-(X(2,2)+X(3,3)-
2*X(2,3)))
f12=p12+d1223*p23
f13=p13+d1323*p23
fprintf('Power flow line 12 %g p.u.:\n',f12);
fprintf('Power flow line 13 %g p.u.:\n',f13);
disp ('.....................................................');
```

MATLAB OUTPUT:

```
Enter p1:0.4
enter p2:-1.3
Enter line reactance 1-2:0.6
Enter line reactance 1-3:0.8
Enter line reactance 2-3:0.4

B =

    2.9167   -1.6667
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   -1.6667    4.1667


X =

    0.4444    0.1778
    0.1778    0.3111

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For outage of generator 1:
Generator shift factor are:

a121 =

    0.4444

a131 =
    0.5556

a231 =

    0.4444

Power flow during outage of generator 1
Power flow line 12 0.288889 p.u.:
Power flow line 23 -1.01111 p.u.:
Power flow line 13 -0.288889 p.u.:
.....................................................
For outage of line 1-2
Line Outage distribution factor are:

d1312 =

    1.0000
d2312 =

   -1.0000

Power flow line 13 0.4 p.u.:
Power flow line 23 -1.3 p.u.:
```

```
.....................................................
For outage of line 1-3
Line Outage distribution factor are:

d1213 =

    1.0000
d2313 =

    1.0000
f12 =

    0.4000
f23 =

   -0.9000

Power flow line 12 0.4 p.u.:
Power flow line 23 -0.9 p.u.:
.....................................................
For outage of line 2-3
Line Outage distribution factor are:

d1223 =

   -1.0000
d1323 =

    1.0000
f12 =

    1.3000
f13 =

   -0.9000

Power flow line 12 1.3 p.u.:
Power flow line 13 -0.9 p.u.:
.....................................................
```