

NODAL ANALYSIS

ONE NODE

```
V1=input('Enter Voltage 1 (Volts) : ');
V2=input('Enter Voltage 2 (Volts) : ');
R1=input('Enter Resistance 1 (Ohms) : ');
R2=input('Enter Resistance 2 (Ohms) : ');
R3=input('Enter Resistance 3 (Ohms) : ');
syms Va
eq=((Va-V1)/R1)+(Va/R2)+((Va-V2)/R3);
V=solve(eq);
fprintf('Nodal Analysis (One Node) : \n');
```

Nodal Analysis (One Node) :

```
fprintf('The Node Va : %.2f V\n',V);
```

The Node Va : 12.50 V

TWO NODES

```
V1=input('\nEnter Voltage 1 (Volts) : ');
V2=input('Enter Voltage 2 (Volts) : ');
R1=input('Enter Resistance 1 (Ohms) : ');
R2=input('Enter Resistance 2 (Ohms) : ');
R3=input('Enter Resistance 3 (Ohms) : ');
R4=input('Enter Resistance 4 (Ohms) : ');
R5=input('Enter Resistance 5 (Ohms) : ');
syms Va Vb
eq1=((Va-V1)/R1)+(Va/R2)+((Va-Vb)/R3);
eq2=((Vb-Va)/R3)+(Vb/R4)+((Vb-V2)/R5);
S=solve([eq1, eq2], [Va, Vb]);
fprintf('Nodal Analysis (Two Nodes) : \n');
```

Nodal Analysis (Two Nodes) :

```
fprintf('Va : %.2f V and Vb : %.2f V',S.Va,S.Vb);
```

Va : 10.95 V and Vb : 12.38 V

WITH CURRENT SOURCE

```
V1=input('\nEnter Voltage 1 (Volts) : ');
I1=input('Enter Current 1 (Ampere) : ');
R1=input('Enter Resistance 1 (Ohms) : ');
R2=input('Enter Resistance 2 (Ohms) : ');
R3=input('Enter Resistance 3 (Ohms) : ');
R4=input('Enter Resistance 4 (Ohms) : ');
syms Va Vb
```

```
eq1=((Va-V1)/R1)+(Va/R2)+((Va-Vb)/R3);
eq2=((Vb-Va)/R3)+(Vb/R4);
S=solve([eq1, eq2], [Va, Vb]);
fprintf('Nodal Analysis (With Current Source) : \n');
```

Nodal Analysis (With Current Source) :

```
fprintf('Va : %.2f V and Vb : %.2f V\n',S.Va,S.Vb);
```

Va : 8.18 V and Vb : 2.73 V

RLC CIRCUIT

```
V1=input('\nEnter Voltage 1 (Volts) : ');
V2=input('Enter Voltage 2 (Volts) : ');
R1=input('Enter Resistance 1 (Ohms) : ');
L1=input('Enter Inductance 1 (Henry) : ');
C1=input('Enter Capacitance 1 (Farad) : ');
XL=1i*(2*pi*60*L1);
XC=-1i/(2*pi*60*C1);
syms Va
eq=((Va-V1)/R1)+(Va/XL)+((Va-V2)/XC);
V=solve(eq);
fprintf('Nodal Analysis (With RLC) : \n');
```

Nodal Analysis (With RLC) :

```
fprintf('The Node Va : %.2f V\n',V);
```

The Node Va : 1.97 V

```
fprintf('The Node Va (phasor) : %.2f ∠ %.2f° V\n', abs(V), angle(V)*180/pi);
```

The Node Va (phasor) : 12.60 ∠ 80.99° V