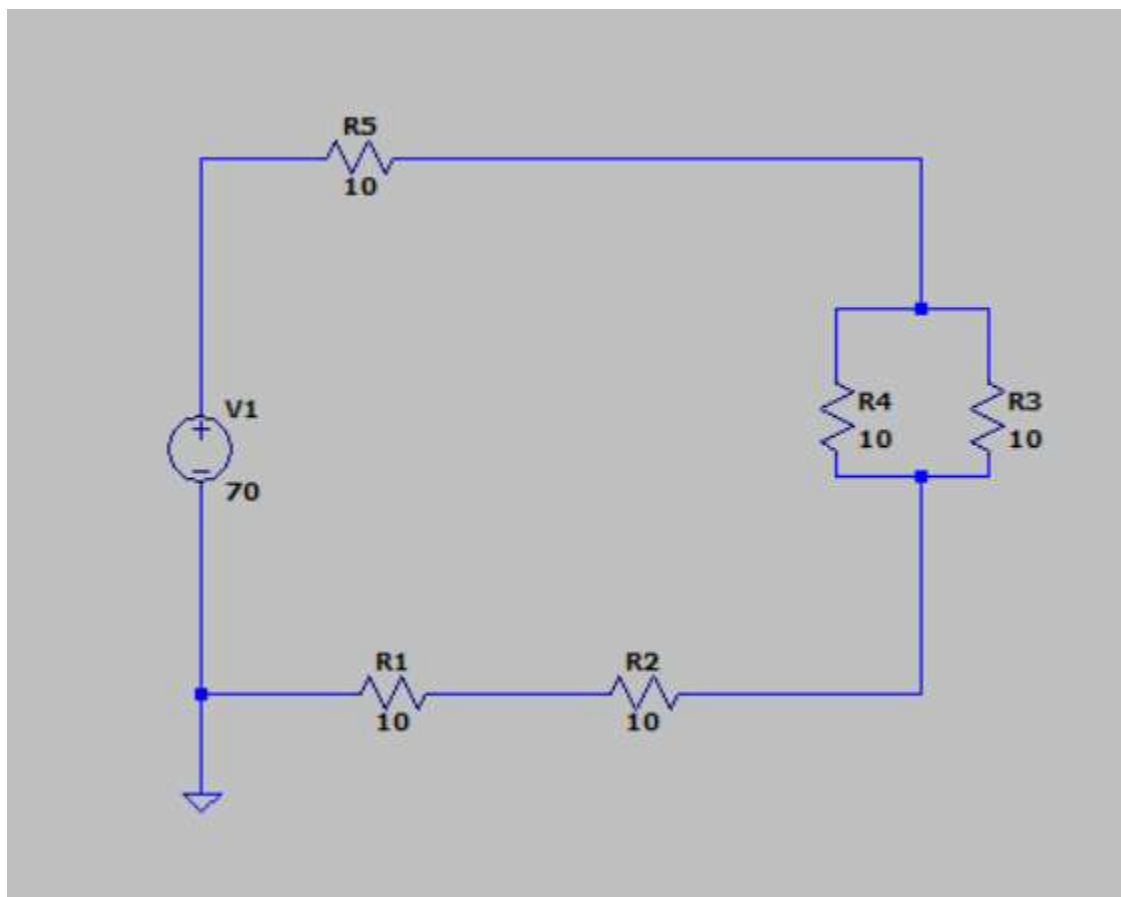# Testing the program

Author: Meysam Asadi BSc student at SUT -Iran-Tehran. Department of EE
Email:meisamasady2002@gmail.com

1)

```
                              V V_1 4 0 DC,70

                              R R_1 1 0 10
                              R R_2 1 2 10
                              R R_3 2 3 10
                              R R_4 2 3 10
                              R R_5 3 4 10
```

--------------voltage of nodes--------------

```
voltage of node V_1 : 20
voltage of node V_2 : 40
voltage of node V_3 : 50
voltage of node V_4 : 70
```

----------current of voltage source----------

```
current of voltage source I(VS)_1 : -2
```

```
simulation time  : 846.4763 secs
```
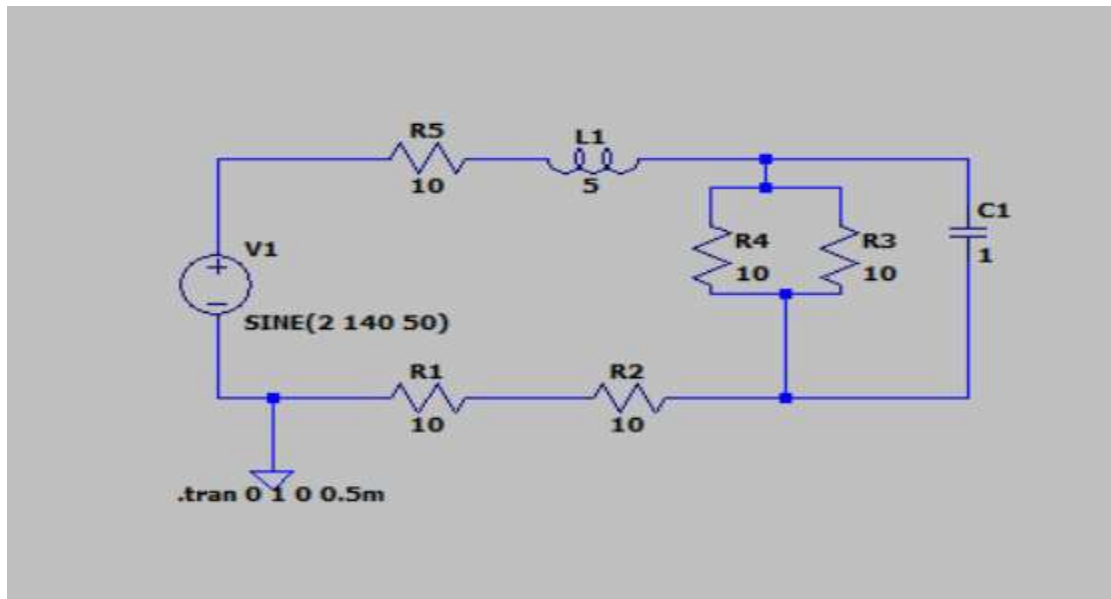
Note that simulation time includes running different sections of code and waiting between them to debug and check different variables.so do not worry if it is unusual sometimes.
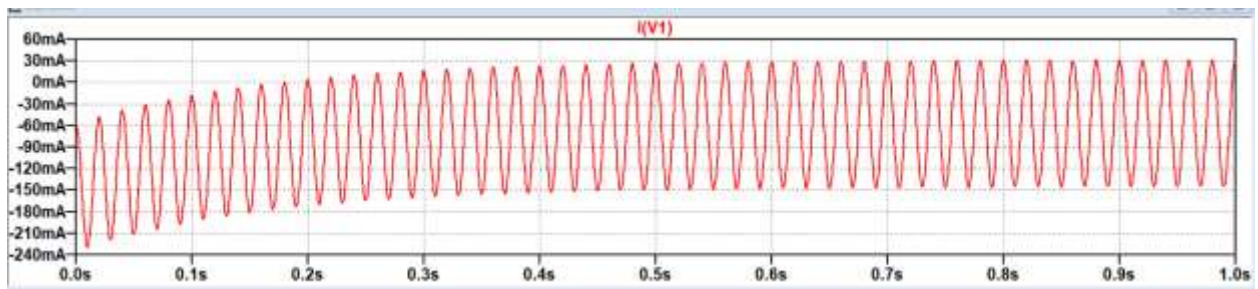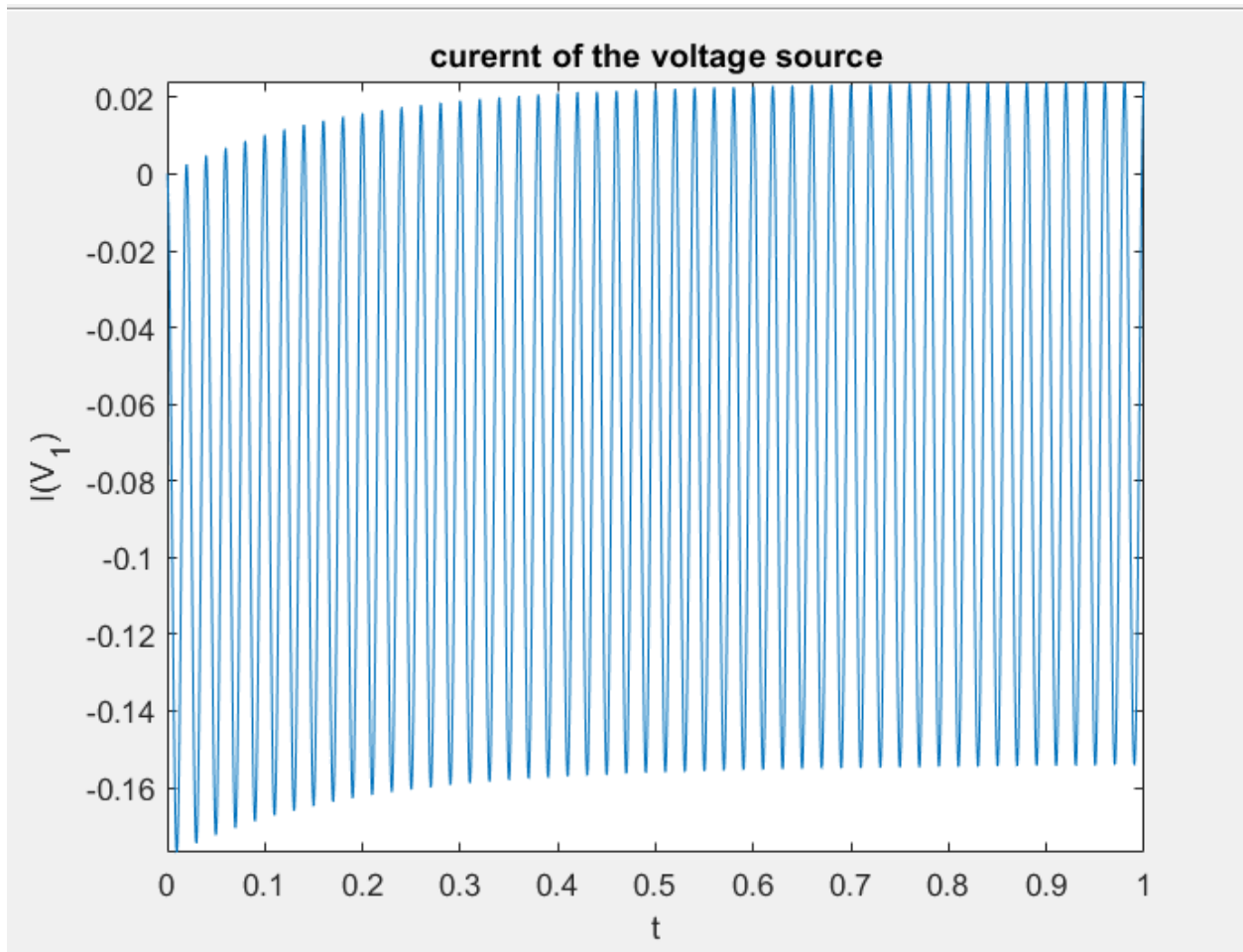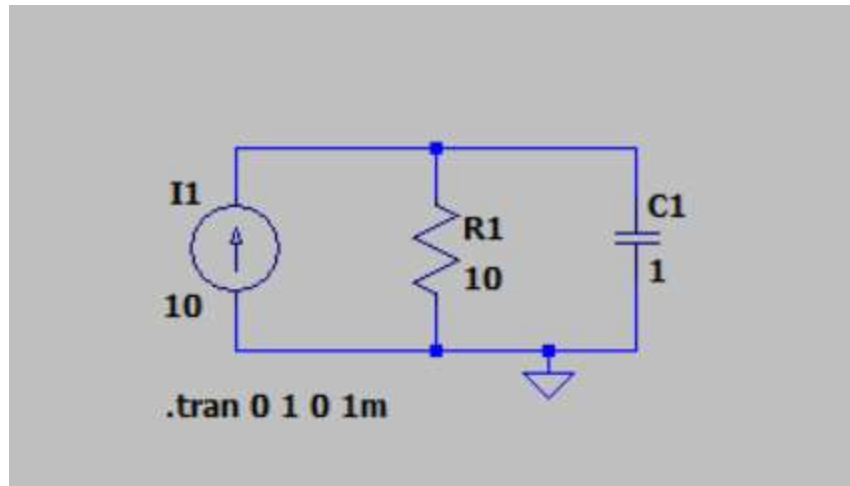
2)

```
1    V V_1 5 0 sin,140,0,50,2
2
3    R R_1 1 0 10
4    R R_2 1 2 10
5    R R_3 2 3 10
6    R R_4 2 3 10
7    R R_5 4 5 10
8    L L_1 3 4 5,0
9    C C_1 3 2 1,0
10
```

One of the desired outputs is plotted below which agrees to the output of LTSPICE.

curernt of the voltage source

I(V1)

3)

```
R R_1 1 0 10
C C_1 1 0 1,0
I I_1 0 1 DC,10
```

---------------voltage of nodes----------------

voltage of node V_1 : 100 - 100*exp(-t/10)

----

simulation time : 8 secs

4)
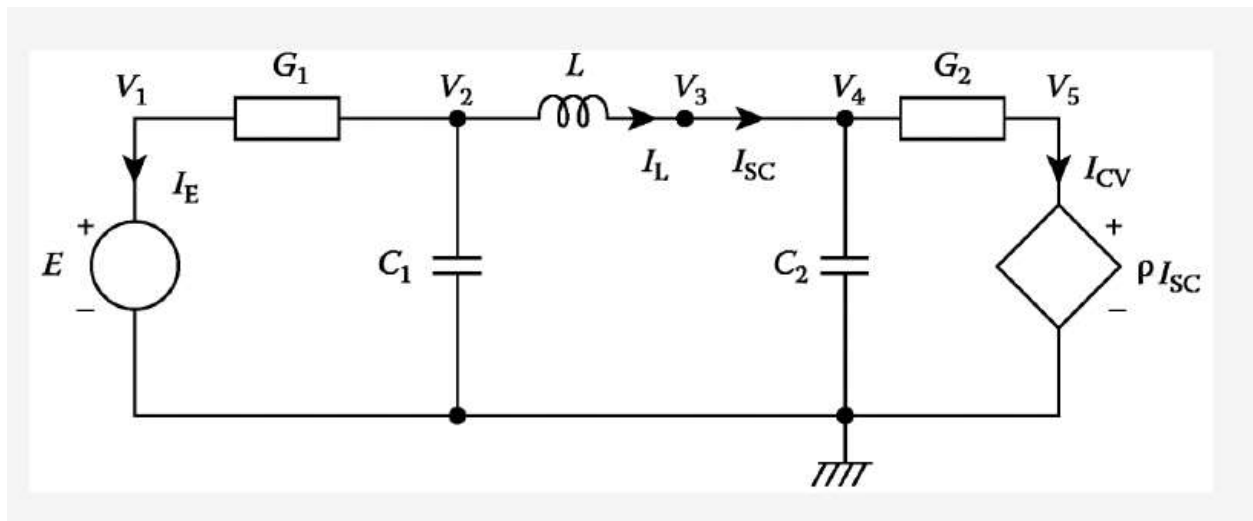
E=sin(100*pi*t)v ,G1=G2=10ohms ,C1=C1=1f,L=1H,p=1,initial conditions of inductor and capacitor =0

```
V V_1 1 0  sin,1,0,50,0
R R_1 1 2 10
C C_1 2 0 1,0
L L_1 2 3 1,0
C C_2 4 0 1,0
R R_2 4 5 10
W W_1 3 4
CCVS CCVS_1 5 0 3,4,1
```

$$
\begin{bmatrix}
G_1 & -G_1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\
-G_1 & G_1+sC_1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & sC_2+G_2 & -G_2 & 0 & 0 & -1 & 0 \\
0 & 0 & 0 & -G_2 & G_2 & 0 & 0 & 0 & 1 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & -1 & 0 & 0 & 0 & -sL & 0 & 0 \\
0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & 0 & 0 & -\rho & 0
\end{bmatrix}
\begin{bmatrix}
V_1 \\ V_2 \\ V_3 \\ V_4 \\ V_5 \\ I_E \\ I_L \\ I_{SC} \\ I_{CV}
\end{bmatrix}
=
\begin{bmatrix}
0 \\ 0 \\ 0 \\ 0 \\ 0 \\ E \\ 0 \\ 0 \\ 0
\end{bmatrix}
$$

MATLAB output:

```
[ 1/10,    -1/10,  0,              0,         0, 1,  0,  0,  0]
[-1/10, s + 1/10,  0,              0,         0, 0,  0,  0,  1]
[    0,        0,  0,              0,         0, 0,  1,  0, -1]
[    0,        0,  0,     s + 1/10,     -1/10, 0, -1,  0,  0]
[    0,        0,  0,        -1/10,      1/10, 0,  0,  1,  0]
[    0,        1, -1,              0,         0, 0,  0,  0, -s]
[    1,        0,  0,              0,         0, 0,  0,  0,  0]
[    0,        0,  1,             -1,         0, 0,  0,  0,  0]
[    0,        0,  0,              0,         1, 0,  0, -1,  0]
```

▶ X'

ıs =

1×9 string array

  "V_1"   "V_2"   "V_3"   "V_4"   "V_5"   "I(VS)_1"   "I(W)_1"   "I(CCVS)_1"   "I(L)_1"

```
>> C'

ans =

[0, 0, 0, 0, 0, 0, (100*pi)/(conj(s)^2 + 10000*pi^2), 0, 0]
```

You can check that the outputs are equivalent.