INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY

HYDERABAD

Department
of
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Analog Electronics Circuits
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Lab: 0

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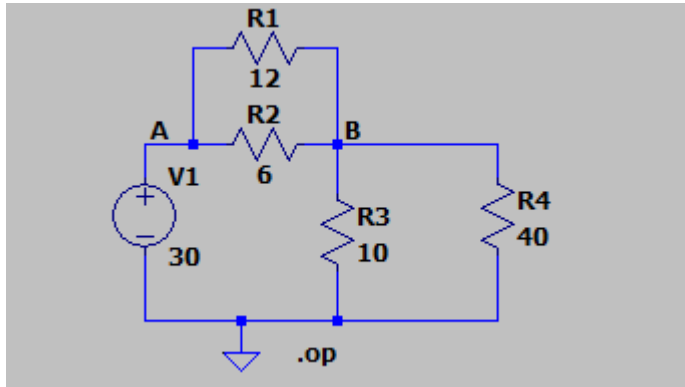Roll no: 2020102062
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1 Objectives

- Analysing the circuit(Parallel Resistors and Current Division)theoretically and simulation using LT-spice of DC operating point and Transient Analysis.

2 Components used

- Voltage source.

- Three resistors.

- connecting wires.

- Ground.

3 Theoretical Calculation:

3.1 DC operating point:

Here we can see Resistance R1 12Ω and R2 6Ω are in parallel, $R_{result1} = 4\Omega$ and also R3 10Ω and R4 40Ω are also in parallel, $R_{result2} = 8\Omega$, these resultant resistances are in Series.
$R_{equivalent} = 12\Omega$.

The current in the entire circuit

$$i = \frac{V}{R}$$

$$= \frac{30}{12} = 2.5$$

.

Voltage across $R_{result1}$: $V = I \times R_{result1} = 2.5 \times 4 = 10V$.
Current through R1:
$$= \frac{10}{12}$$
$$= 0.8333A$$

Current through R2:
$$= \frac{10}{6}$$
$$= 1.667A$$

.

Voltage across $R_{result2}$: $V = I \times R_{result2} = 2.5 \times 8 = 20V$.

Since R3 and R4 are in parallel they have same voltages.

Current through R3:
$$= \frac{20}{10}$$
$$= 2A$$

Current through R4:
$$= \frac{20}{40}$$
$$= 0.5A$$

.

4 Observations:

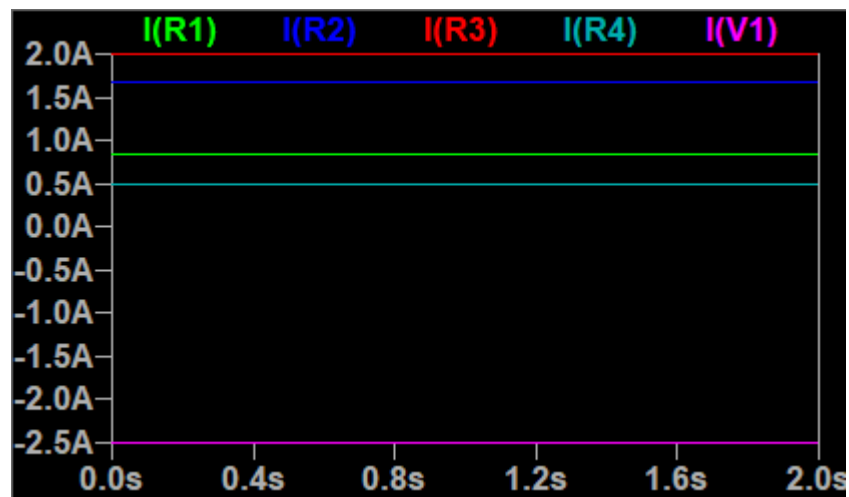- I observed that both Theoretical and simulation in LT-spice results were same.

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         --- Operating Point ---

V(a):              30              voltage
V(b):              20              voltage
I(R2):             1.66667         device_current
I(R1):             0.833333        device_current
I(R4):             0.5             device_current
I(R3):             2               device_current
I(V1):             -2.5            device_current
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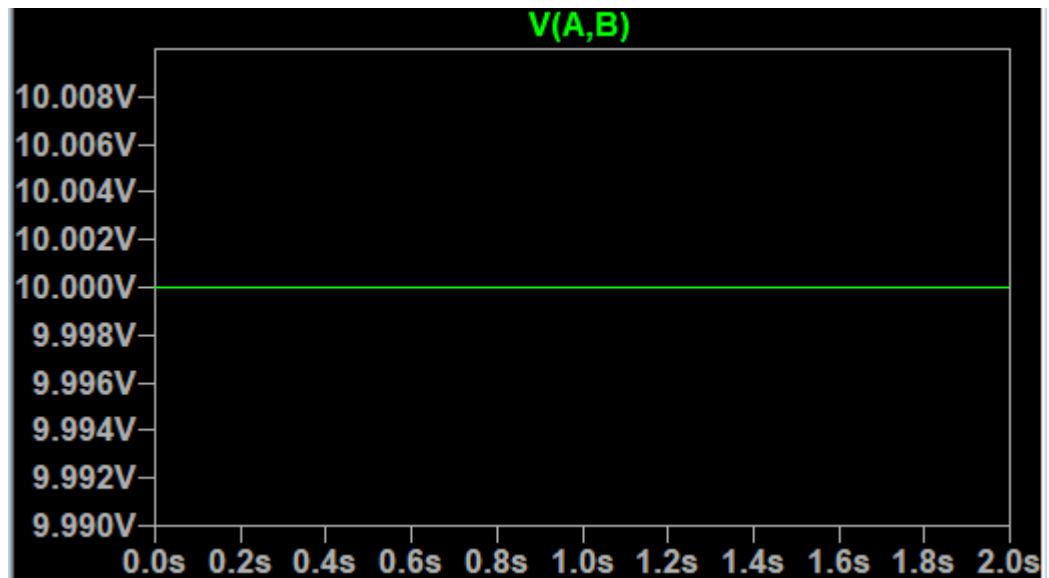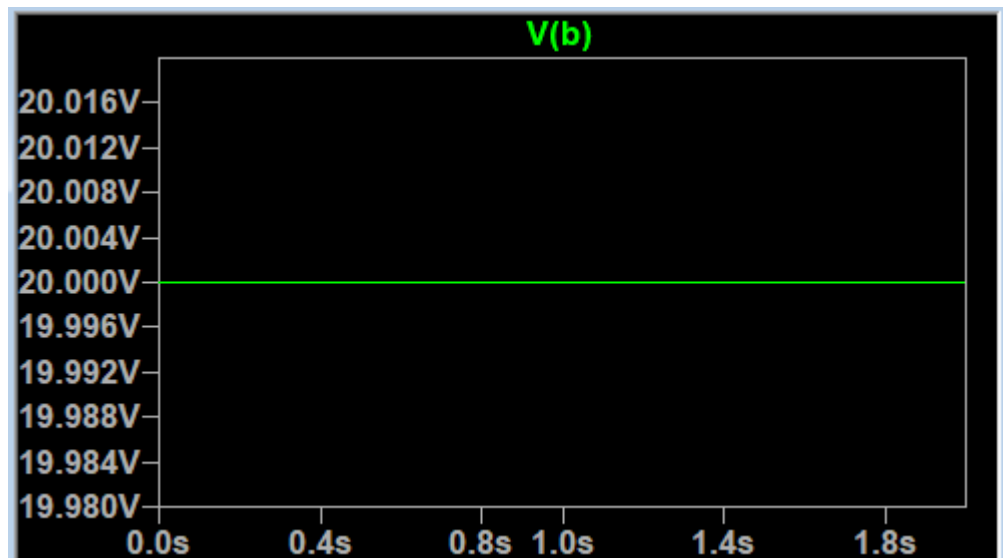
5   Plots

Plots of above DC operating values using Transient analysis.

Plots of current across the resistors.

Plot of voltage drop across A and B.

Plot of voltage drop across B and ground

6   Conclusion

- LT -spice is a good tool which helps us to understand the subject both theoretically and conceptually.

- I conclude that both the results DC operating values, theoretical and Transient Analysis were same.