ECE 281

Electrical Circuits and Instrumentation + Laboratory

Fall 2016/2017

LAB # 10

12.12.2016

First Order Circuits :

Objective:

1. **To observe the behavior of current and voltage on a capacitor with respect to time**
2. **To observe the behavior of current and voltage on an inductor with respect to time**
3. **Maximum power transfer**

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1. To observe the behavior of current and voltage on a capacitor with respect to time (50 Points)

1. Use digital multi meter to measure the currents and an analog multi meter to measure the voltages.
2. If you have to restart your experiment, first you must to discharge the capacitor by simply short circuit both legs of the capacitor with a wire

Procedure:

1. Construct the circuit in Figure 1 **(R= 100kΩ, and C= 1000μF)**.

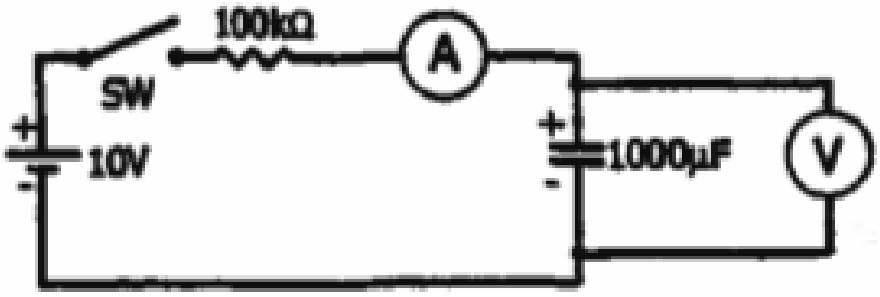


Figure 1: RC Circuit.

2. Bring the selector of the digital multi meter to 4 mA DC.
3. Bring the selector of the analog multi meter to 10 V DC.
4. Place both multi meters side by side to observe them together.
5. Close switch, note the time, this is t=0
6. Measure i and v at t=0

7. Measure i and v after every 20 seconds. (Make your own table to hold the scores)
8. Plot current and voltage with respect to time at Figure 2 and Figure 3

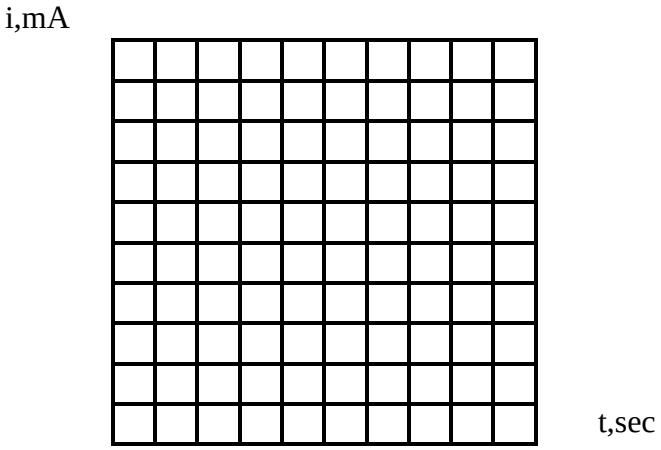


Figure 2

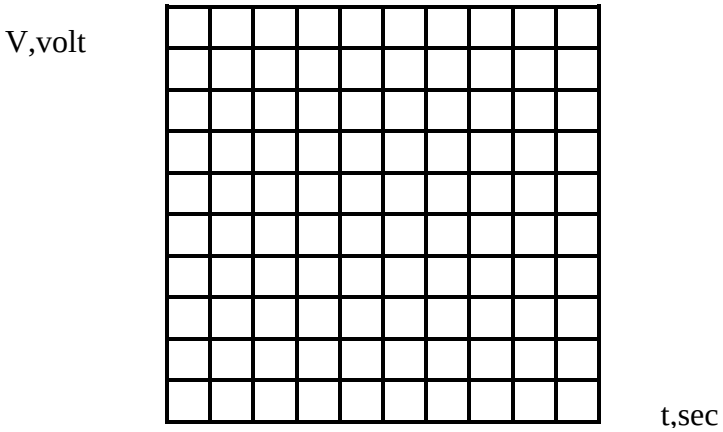


Figure 3

Question:

- Does the voltage lags behind the current with respect to your observations and your plots in Figure 2 and Figure 3.

2. To observe the behavior of current and voltage on an inductor with respect to time (50 Points)

1. Use digital multi meter to measure the voltages and an analog multi meter to measure the currents.

Procedure:

1. Construct the circuit in Figure 4 **(R= 1kΩ, and L= 100mH)**.

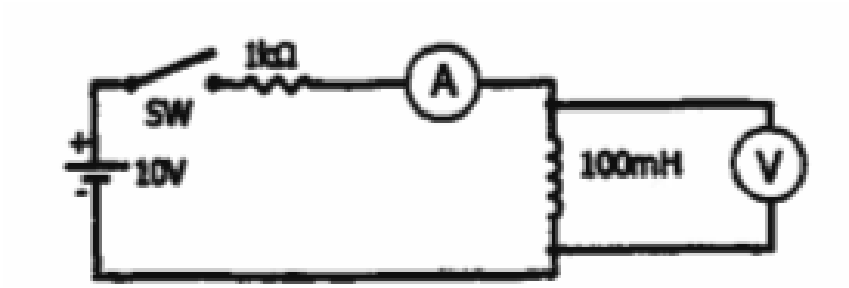
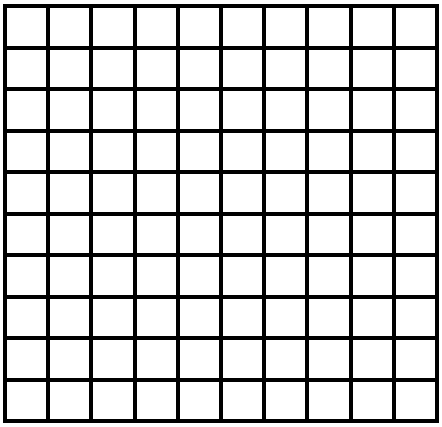


Figure 4: RL Circuit.

2. Bring the selector of the digital multi meter to 4 V DC.
3. Bring the selector of the analog multi meter to 25 mA DC.
4. Place both multi meters side by side to observe them together.
5. Close switch, note the time, this is t=0
6. Measure i and v at t=0
7. Measure i and v after every 20 seconds. (Make your own table to hold the scores)
8. Plot current and voltage with respect to time at Figure 5 and Figure 6

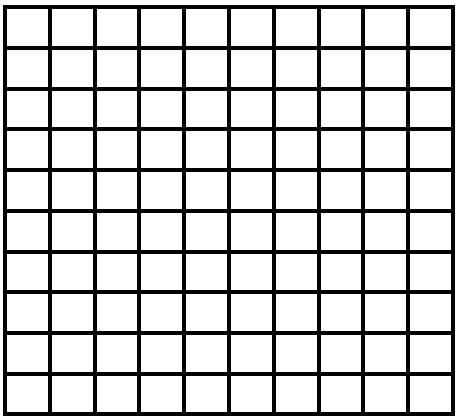
i,mA



t,sec

Figure 5

V,volt



t,sec

Figure 6

Question:

- Does voltage lags behind the current with respect to your observations and your plots in Figure 5 and Figure 6.