# Electric Circuits II – Laboratory 02

# RL circuit analysis

| # | Student ID | Student Name | Grade (10) | Instructor signature |
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| 1 | | | | |

| Delivery Date | |
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## Objective

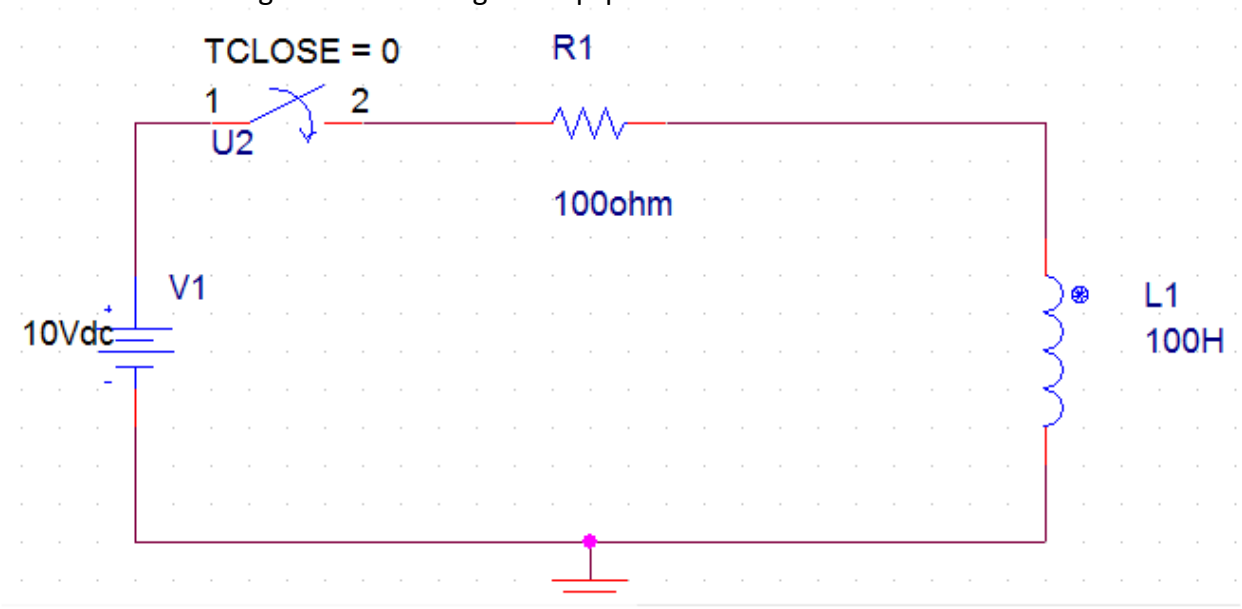
In this exercise, the DC steady state response of simple RL circuits are examined. The transient behavior of RC circuits is also tested.

## Theory Overview

The DC steady state response of RL circuits are essential opposite of each other: that is, once steady state is reached, capacitors behave as open circuits while inductors behave as short circuits. In practicality, steady state is reached after five time constants. The time constant for an RL circuit is simply the effective capacitance times the effective resistance, $\tau = L/R$.

## Procedure

1. Build the following schematic using orcad pspice




2. You can find switch on EVAL library named SW_tClose
3. Use time domain transient in simulation profile, set the runtime to 6 seconds
4. Run simulation then plot the relation between I(L1) and time

Results and data analysis

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|---|---|
| $\tau$ | |

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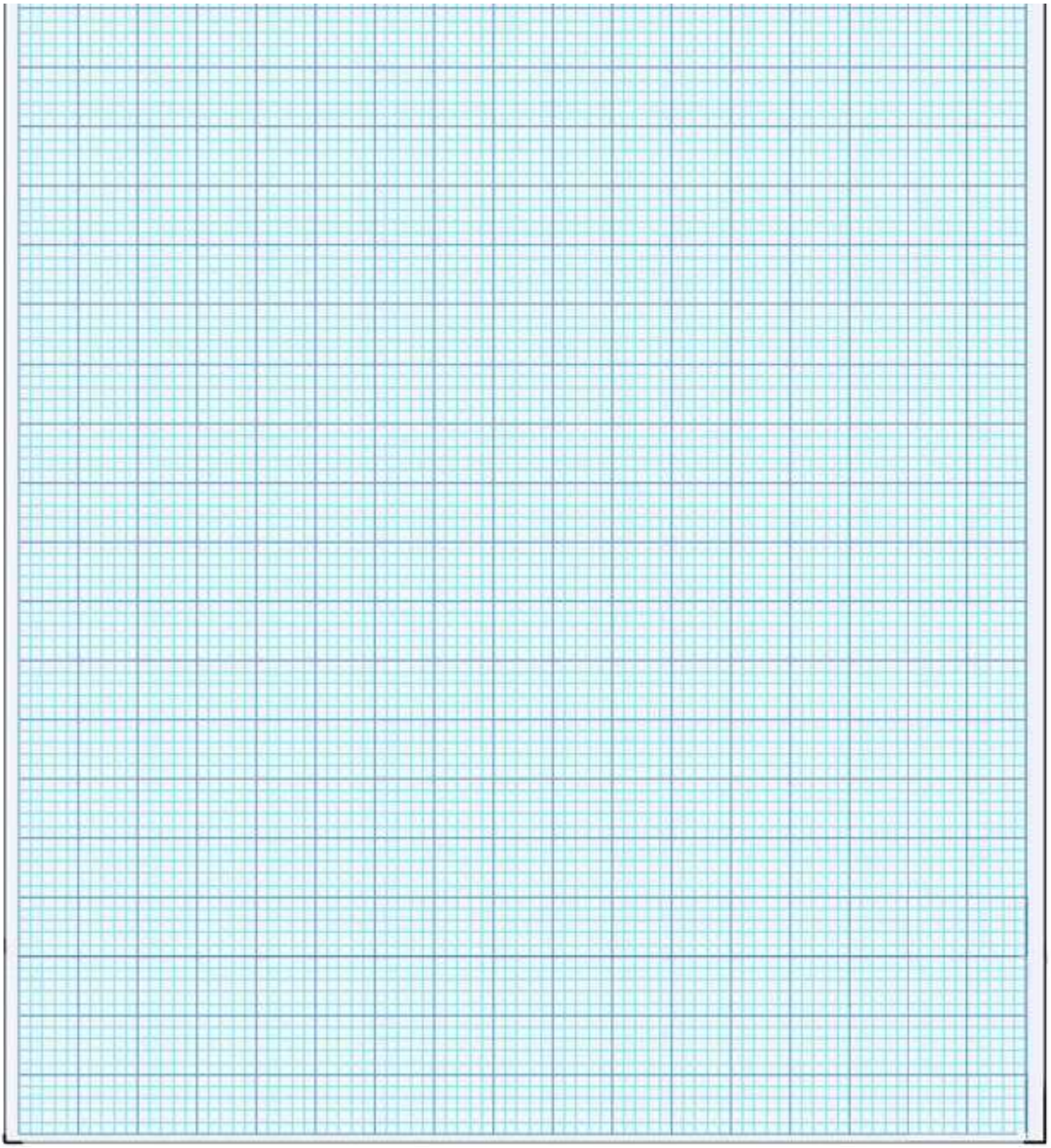
|---|---|
| $Il(\tau)$ simulated | |
| $Il(\tau)$ calculated | |
| Deviation | |

| Time (sec) | $I_L$ |
|---|---|
| 0.0 | |
| 0.2 | |
| 0.4 | |
| 0.6 | |
| 0.8 | |
| 1.0 | |
| 1.2 | |
| 1.4 | |
| 1.6 | |
| 1.8 | |
| 2.0 | |
| 2.2 | |
| 2.4 | |
| 2.6 | |
| 2.8 | |
| 3.0 | |
| 3.2 | |
| 3.4 | |
| 3.6 | |

| | |
|---|---|
| 3.8 | |
| 4.0 | |
| 4.2 | |
| 4.4 | |
| 4.6 | |
| 4.8 | |
| 5.0 | |
| 5.2 | |
| 5.4 | |
| 5.6 | |
| 5.8 | |
| 6.0 | |



# Questions and Conclusions

1. What is a reasonable approximation for a inductor at DC steady state?

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2. How can a reasonable approximation for time-to-steady state of an RL circuit be computed?

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3. In general, what sorts of shapes do the Current flow of DC RL circuits follow?

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