



BERZIET UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ENEE 2110

Circuits Laboratory

Experiment.5 Prelab

First order circuit

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Supervised by:

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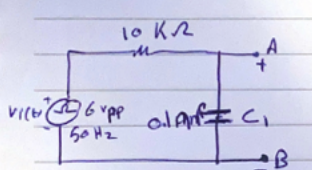
Teaching Assistance:

Eng. Mohammad Deek

Aug.2025

Part A: Step response of First -order RC circuit :

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part A

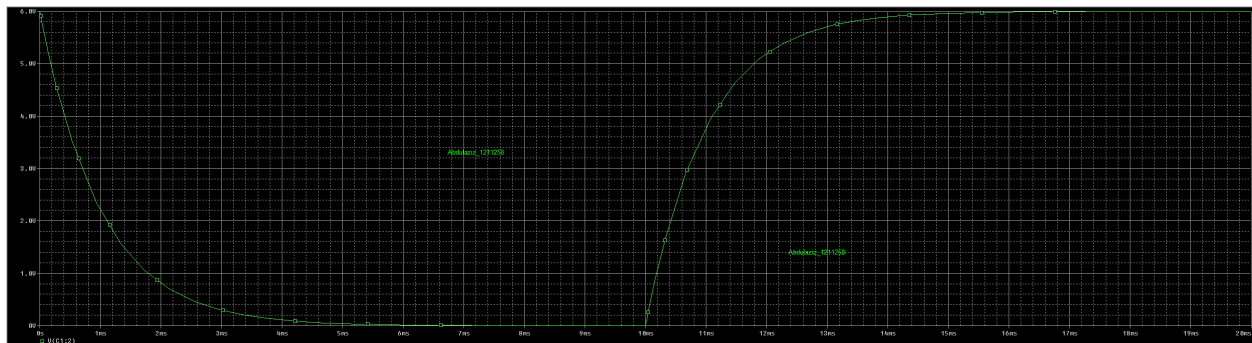
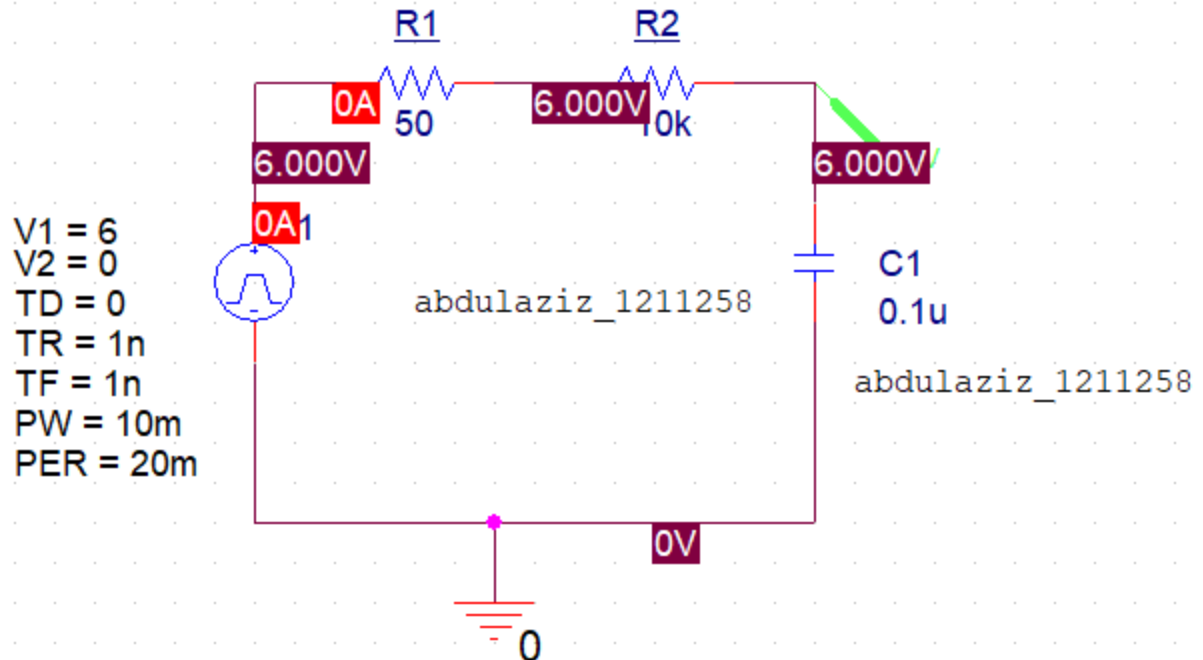


$T = RC$
 $= 10K \times 0.1\mu F$
 $= 1ms$

$V_C(0) = 0$
 $V_C(\infty) = 6 \rightarrow 4$

$V_C(t) = V_C(\infty) + [V_C(0) - V_C(\infty)] e^{-t/\tau}$
 $V_C(t) = 6 + [0 - 6] e^{-t/1ms}$

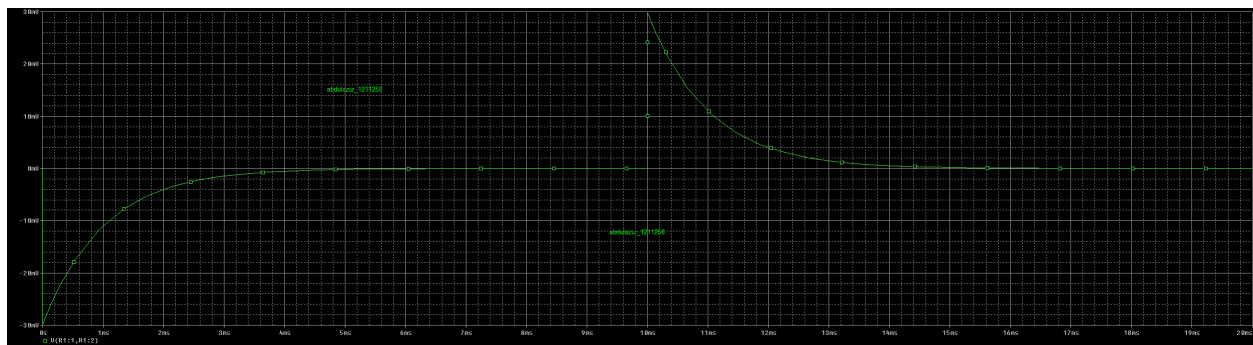
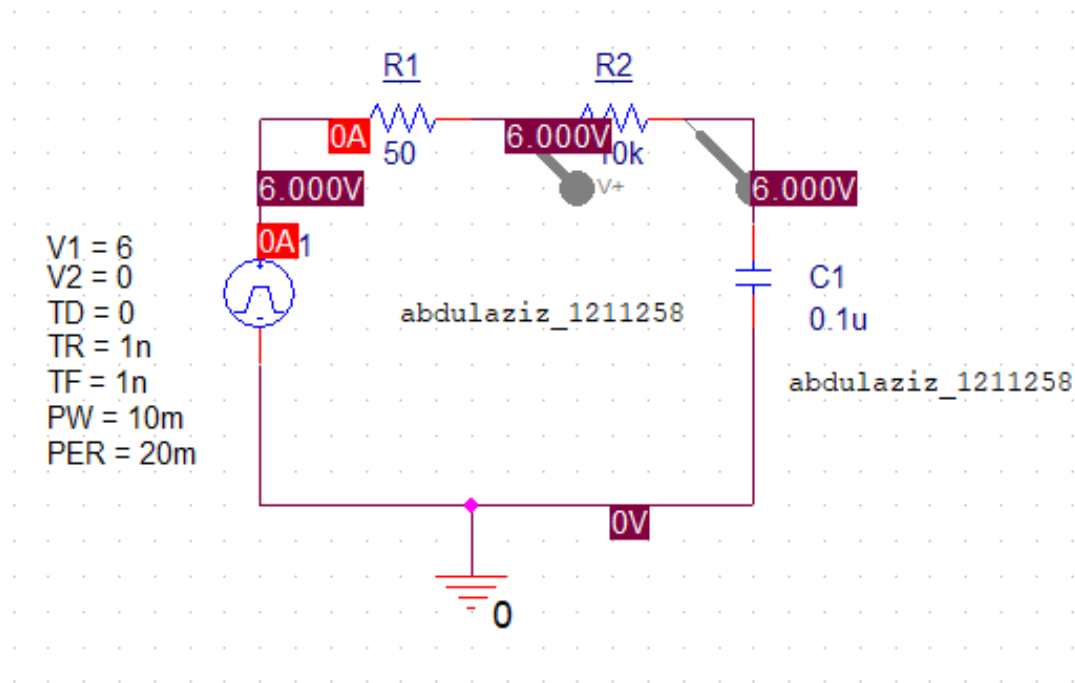
$\Rightarrow V_C(t) = 6 - 6e^{-1000t}$



$V = 0.37 \cdot V_{\text{initial}} = 0.37 \cdot 6 = 2.22$ in the discharging cycle.

$V = 0.63 \cdot V_{\text{initial}} = 0.63 \cdot 6 = 3.8$ in the charging cycle.

$(\tau) = 10.986 - 10 = 1\text{ms}$.

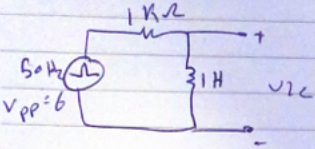


$V = 0.37 \cdot V_{\text{initial}} = 0.37 \cdot 6 = 2.22$ in the discharging cycle.

$(\tau) = 1\text{ms}.$

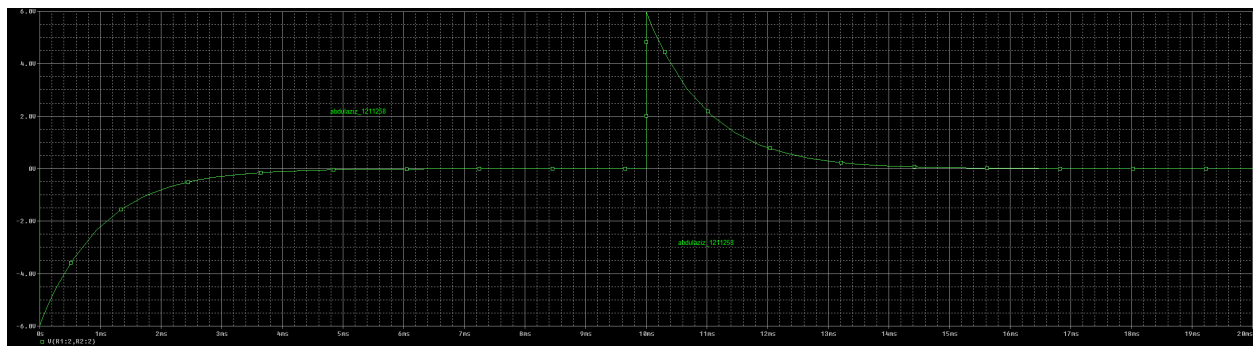
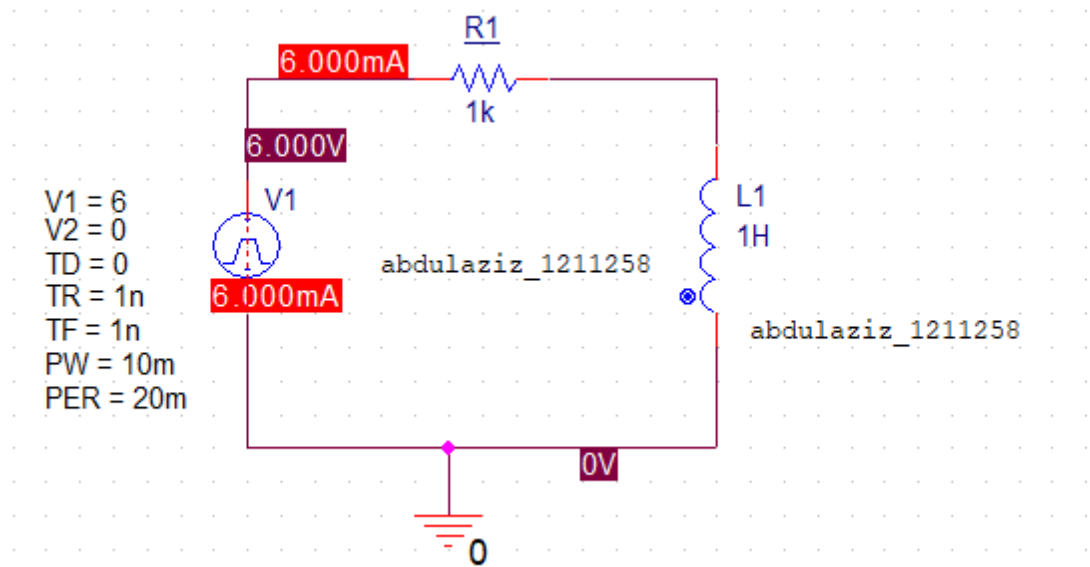
Part B: Step response of first-order RL circuit :

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part B :-



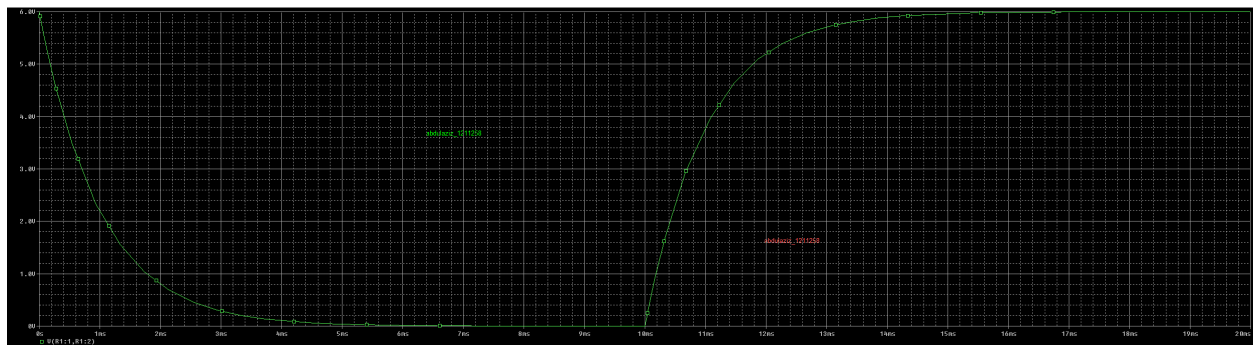
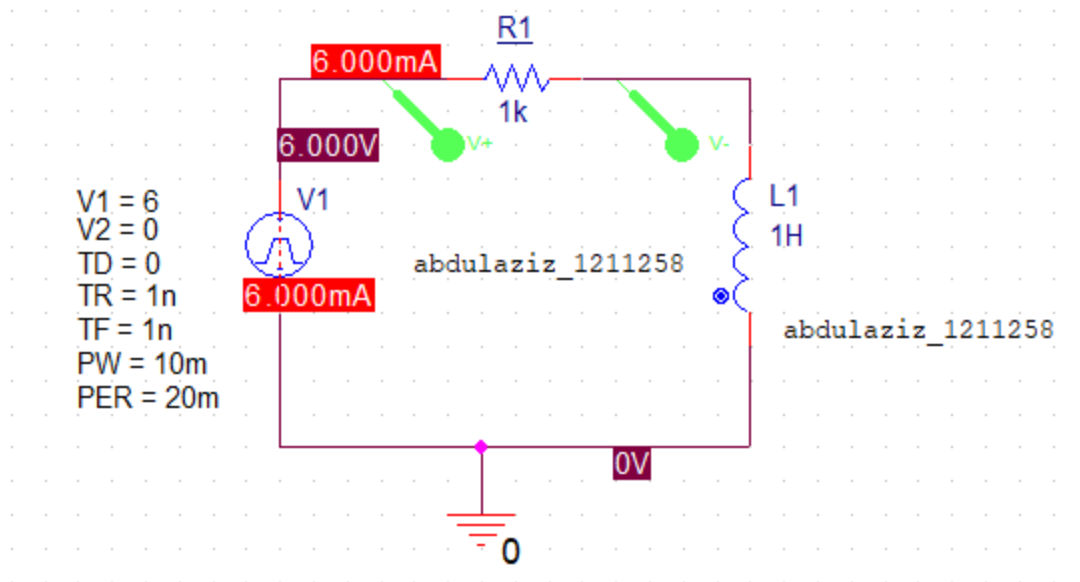
$T = \frac{L}{R}$
 $= \frac{31 \text{ H}}{1 \text{ k}\Omega}$
 $T = 31 \text{ ms}$
 $T \approx 1 \text{ ms}$

$$V_L(t) = [V_L(\infty) + [V_L(0) - V_L(\infty)] e^{-t/\tau}]$$
$$V_L(0) = V_L(0) = 6 \text{ V}$$
$$V_L(\infty) = 0 \text{ V}$$
$$V_L = 0 + [6 - 0] e^{-t/1 \text{ ms}}$$
$$V_L(t) = 6 e^{-1000t}$$



$V = 0.37 \cdot V_{\text{initial}} = 0.37 \cdot 6 = 2.22$ in the discharging cycle.

$(\tau) = 1\text{ms}$.



$V = 0.37 * V_{initial} = 0.37 * 6 = 2.2$ in the discharging cycle.

$V = 0.63 * V_{initial} = 0.63 * 6 = 3.8$ in the charging cycle.

$(\tau) = (10.986 - 10) = 1ms.$