

EE1100 Basic Electrical Engineering

March – June 2023

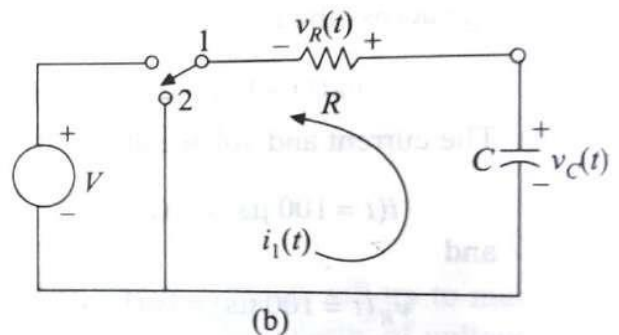
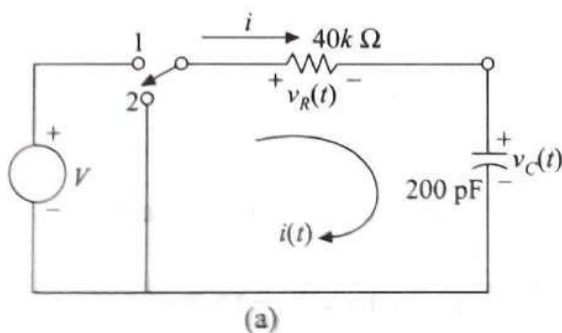
Tutorial 3

DC Transient Analysis

1. Find the current in a series RL circuit having $R = 2\ \Omega$ and $L = 10\ \text{H}$ when a DC voltage of $100\ \text{V}$ is applied. Find the value of the current $5\ \text{s}$ after the application of the DC voltage.
2. A series RL circuit has $R = 25\ \Omega$ and $L = 5\ \text{Henry}$. A dc voltage V of $100\ \text{V}$ is applied to this circuit at $t = 0\ \text{secs}$. Find :
 - a. The equations for the charging current , and voltage across R & L .
 - b. The current in the circuit $0.5\ \text{s}$ after the voltage is applied.
 - c. The time at which the voltage drops across R and L are equal.
3. In the circuit shown below the switch is kept in position 1 up to $100\ \mu\text{s}$ and then it is moved to position 2 . Supply voltage is $5\ \text{V DC}$.

Find:

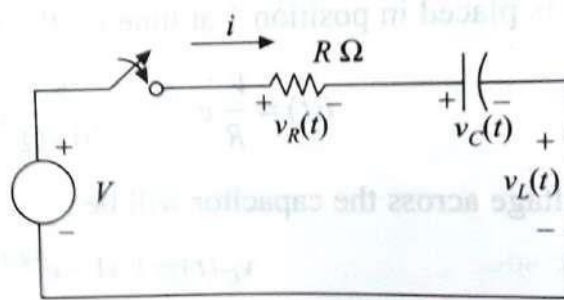
- a. The current and voltage across the capacitor at $t = 40\ \mu\text{s}$
- b. The current and voltage across the resistor at $t = 150\ \mu\text{s}$



4. A series RLC circuit as shown in the figure below has $R = 5\ \Omega$, $L = 2\text{ H}$ and $C = 0.5\text{ F}$.

The supply voltage is 10 V DC . Find

- The current in the circuit when there is no initial charge on the capacitor.
- The current in the circuit when the capacitor has initial voltage of 5 V .
- Repeat question (a) when the resistance is changed to $4\ \Omega$
- Repeat question (a) when the resistance is changed to $1\ \Omega$



5. In the circuit shown below find an expression for the current $i(t)$ when the switch is opened at time $t = 0$

