# Aula 13 - Exercise Class 4

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June 5, 2017

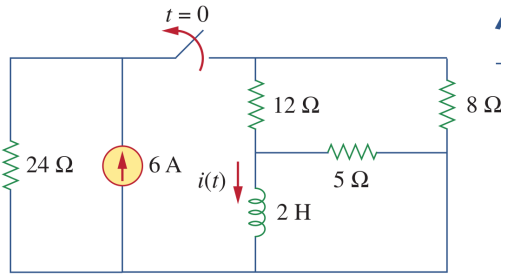
# Contents



Introduction to Electric Circuits by James A. Svoboda, Richard C. Dorf, 9th Edition

# First-Order Circuit RL

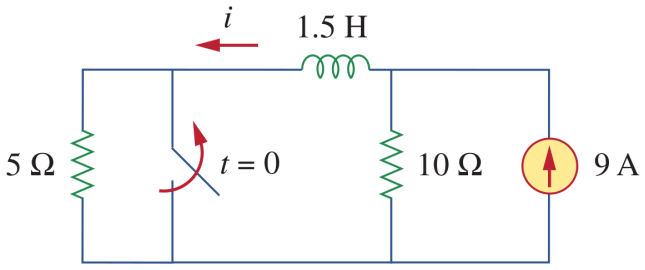
**Practice Problem 7.4** - For the circuit in Fig. below, find $i(t)$ for $t > 0$.




Answer: $2e^{-2t}\ A,\ t > 0.$

# Step Response of an First-Order Circuit

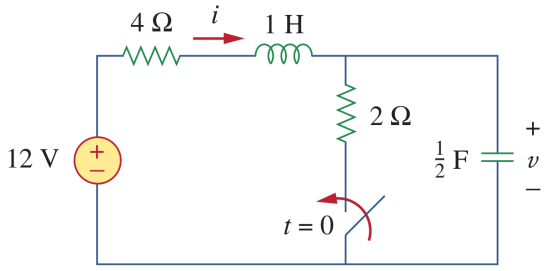
**Practice Problem 7.12** - The switch in Fig. below has been closed for a long time. It opens at $t = 0$. Find $i(t)$ for $t > 0$.




Answer: $i(t) = 6 + 3e^{-10t}$ *A for all* $t > 0$.

# Circuit Theorems

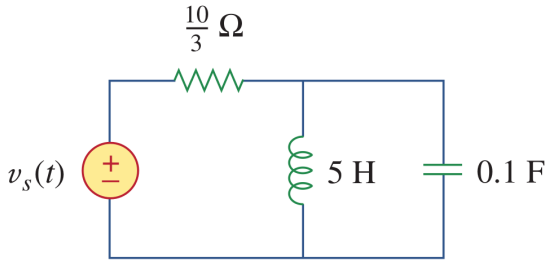
**Example 8.9** - Find the complete response v and then $i$ for $t > 0$ in the circuit of Fig. below.




Answer: $v(t) = 4 + 12e^{-2t} - 4e^{-3t}\ V,\ t > 0$

# Circuit Element Models

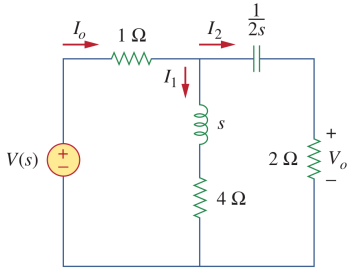
**Example 16.4** - Consider the circuit in Fig. below. Find the value of the voltage across the capacitor assuming that the value of $v_s(t) = 10u(t)\ V$ and assume that at $t = 0$, -1 A flows through the inductor and +5 V is across the capacitor.




Answer: $v_c(t) = (35e^{-t} - 30^{-2t})u(t)$

# Transfer Functions

**Problem 7.8-6** - Determine the transfer function $H(s) = \frac{I_1(s)}{I_o(s)}$ of the circuit in Fig. below.




Answer: $H(s) = \dfrac{4s+1}{2s^2+12s+1}$