


Academic year 2018/2019

Electrical Circuits (2)

2nd year elec.


CHAPTER 3: SECOND ORDER CIRCUITS

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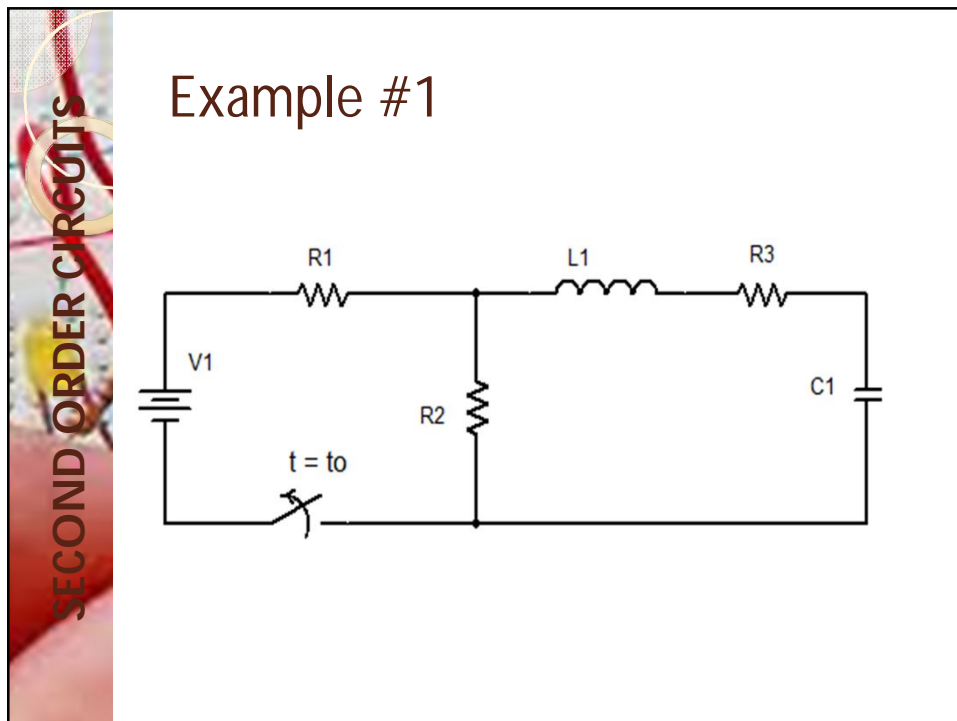
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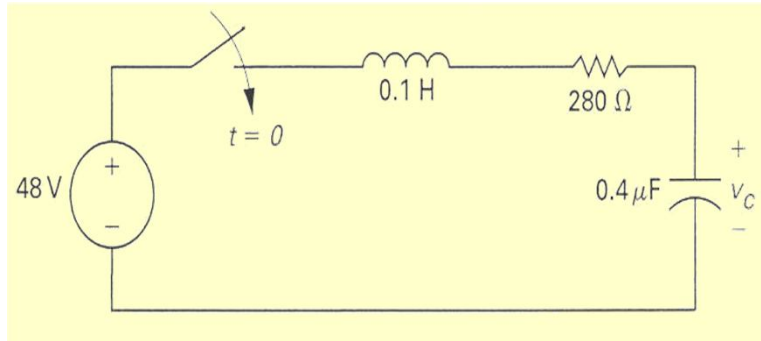


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Example 2

No energy is stored in the 100mH inductor or 0.4 μ F capacitor when switch in the circuit is closed. Find $v_C(t)$ for $t \geq 0$.

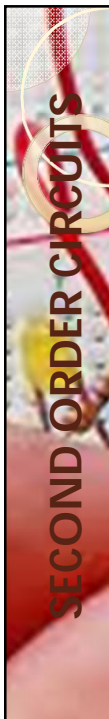


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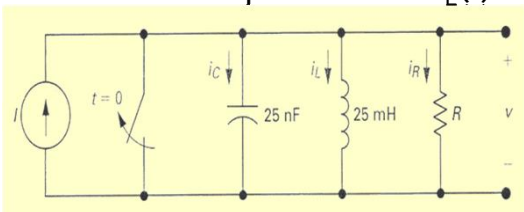
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Example 3

The initial energy stored in the circuit is zero. At $t = 0$, a DC current source of 24mA is applied to the circuit. The value of the resistor is 400Ω .


1. What is the initial value of i_L ?
2. What is the initial value of di_L/dt ?
3. What is the roots of the characteristic equation?
4. What is the numerical expression for $i_L(t)$ when $t \geq 0$?





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SECOND ORDER CIRCUITS


Example 4 (ex.3.5 in book)

In the circuit shown, find $i(t)$ and $i_R(t)$ for $t > 0$.

The circuit diagram shows a 4 A current source on the left. A switch is in series with a 20 H inductor, with the switch opening at $t=0$. This inductor is in parallel with a 20 Ω resistor. The current through the inductor is labeled i and the current through the resistor is labeled i_R . This parallel combination is in series with an 8 mF capacitor, with voltage v across it. Finally, there is a 20 Ω resistor in series with a $30u(-t)$ V voltage source.

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