

ECE 207L - SECOND ORDER CIRCUITS - LAB 20

NATURAL RESPONSES OF 2ND ORDER LC TANK CIRCUITS

FALL 2003

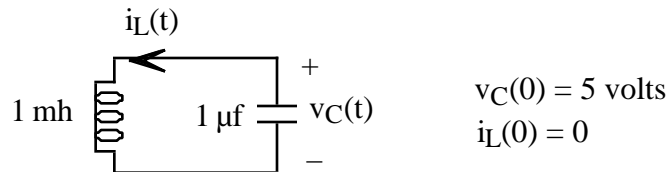
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OBJECTIVE

The objective of this lab is to make use of SPICE to find the responses of second order LC tank circuits.

LAB

1. Given the following second order LC tank circuit



- a. Make use of SPICE to obtain graphs of $i_L(t)$ and $v_C(t)$
- b. Make use of your graphs to obtain equations for $i_L(t)$ and $v_C(t)$. Explain how you got your results
- c. Compare the frequencies of your sinusoids in part (b) with the theoretical value for their frequencies

$$\omega_o = \frac{1}{\sqrt{LC}}$$

- d. Make use of your results to calculate the total energy $E_T(t) = E_L(t) + E_C(t)$ at time $t = 0$ and at three other times - times different from your partner's. How is the energy being stored in this ideal circuit varying as a function of time. Explain what's going on.