ECE 207L - FIRST ORDER RL CIRCUITS - LAB 18
INTRODUCTION TO INDUCTORS

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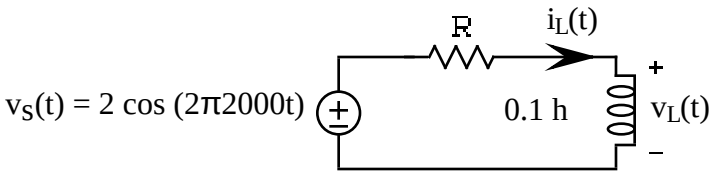
OBJECTIVE

The objective of this lab is to demonstrate that an inductor's voltage $v_L(t)$ and current $i_L(t)$ are related as follows

$$v_L(t) = L \frac{di_L(t)}{dt}$$

LAB

1. Given the following circuit



PARTNER 1: R = 1K PARTNER 2: R = 2K

   a. Measure your resistor and inductor values. Compare with nominal values
   b. Measure the amplitudes and phases of $i_L(t)$ and $v_L(t)$. The phases should be with respect to $v_S(t)$.
   c. Make use your results in part (b) to write expressions for $i_L(t)$ and $v_L(t)$ as cosines
   d. Make use of your measured value for $i_L(t)$ to calculate $v_L(t)$ from the expression

$$v_L(t) = L \frac{di_L(t)}{dt}$$

      Express your result as a cosine.
   e. Compare your calculated and measured values in parts (b) and (d) for the amplitude and phase of $v_L(t)$

2. Given any two inductors L_1 and L_2
   a. Measure their values
   b. Calculate the equivalent inductances when they're connected in series and when they're connected in parallel
   c. Measure the equivalent inductances when they're connected in series and when they're connected in parallel
   d. Now compare you measured and calculated equivalent inductances in parts (b) and (c)