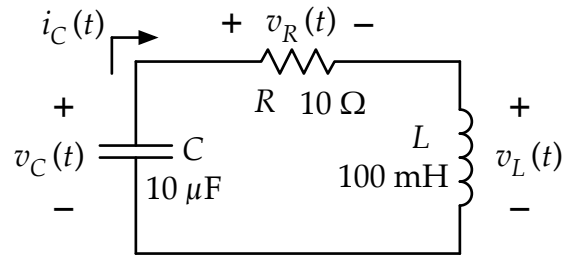


In the series  $RLC$  circuit shown below, the voltage across the capacitor is known to be

$$v_c(t) = V_m e^{-\frac{t}{\tau}} \cos(\omega t)$$

where  $V_m = 5 \text{ V}$ ,  $\tau = 20 \text{ ms}$ , and  $\omega = 1000 \text{ rad/s}$ .

Determine the expressions of  $v_R(t)$  and  $v_L(t)$ .



$$v_R(t) = \underline{\hspace{15cm}}$$

$$v_L(t) = \underline{\hspace{15cm}}$$

Hint: Determine the expression current from the capacitor (note the direction in relation to the voltage polarity). Use the current expression to help find the resistor and inductor voltages. And yes, the expressions are messy.