NAME: LAB SECTION:

RUTGERS

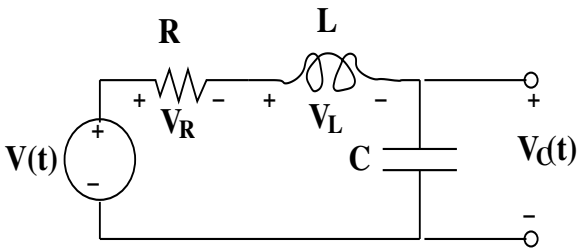
School of Engineering
Department of Electrical and Computer Engineering

332:221 **Principles of Electrical Engineering I** **Fall 2012**

Quizlette 8

USING A CALCULATOR WILL SLOW YOU DOWN! Final answers must appear in the appropriate box. Show your work outside the box.

1. **Basic Stuff:** The differential equation that relates $V(t)$ to $V_C(t)$ is



$$V_C + LC\frac{d^2V_C}{dt^2} + RC\frac{dV_C}{dt} = V(t)$$

(a) *(2 pts)* What is the transfer function $H(j\omega)$ between input $V(t)$ and output $V_C(t)$?

(b) *(2 pts)* Suppose $V(t) = \cos t$ and all transients have died out of the circuit. Assuming $R = C = L = 1$ (in appropriate units), what is:

i. *(1 pts)* the phasor form of the transfer function value?

ii. *(1 pts)* $V_C(t)$?

2. **Still Basic:**

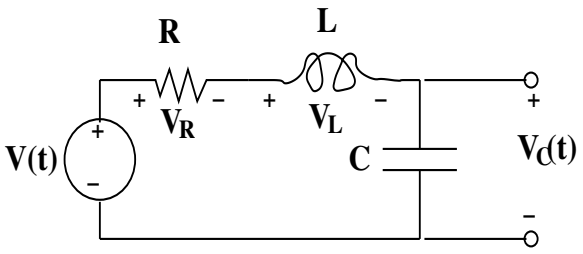


Figure 1:

(a) *(2 pt)*
Please derive the differential equation that relates input voltage $V(t)$ to the current $I_L(t)$ through the inductor.

(b) *(2 pts)* What is the transfer function $H(j\omega)$ between input $V(t)$ and output $I_L(t)$?

(c) *(1 pts)* Suppose $V(t) = \cos t$ and all transients have died out of the circuit. Assuming $R = C = L = 1$ (in appropriate units), what is $I_L(t)$?