ECE 2260
F 08

HOMEWORK #2

THE
UNIVERSITY
OF UTAH
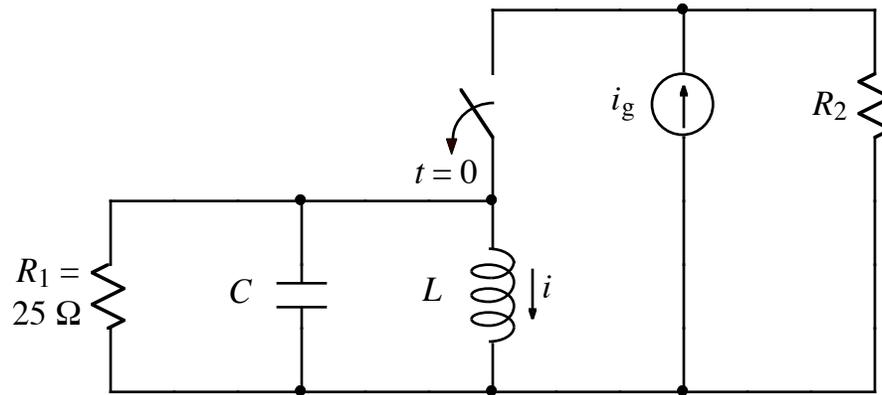
1.

After being closed for a long time, the switch opens at $t = 0$.

Give expressions for the following in terms of i_g, R_1, R_2, L, and C:
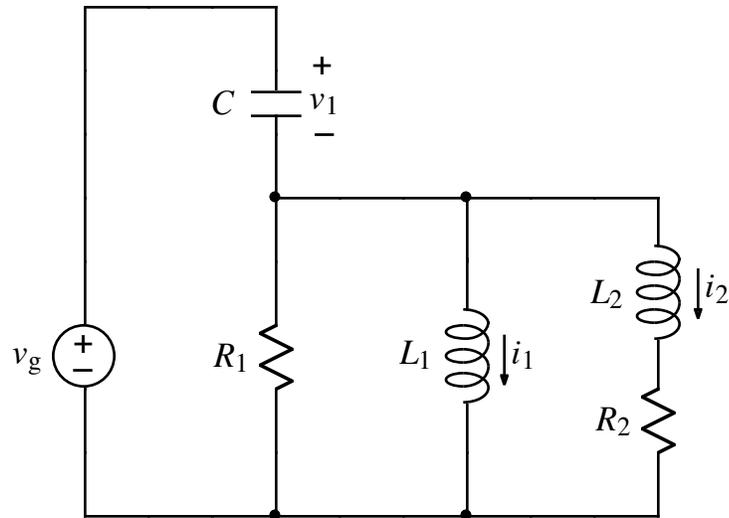
$$i(t = 0^+) \qquad \text{and} \qquad \left.\frac{di(t)}{dt}\right|_{t=0^+}$$

2.   Find the numerical values of L and C to yield the following values for the above circuit:

$$\alpha = 1 \text{ Mr/s} \qquad \text{and} \qquad \omega_o = 50 \text{ kr/s}$$
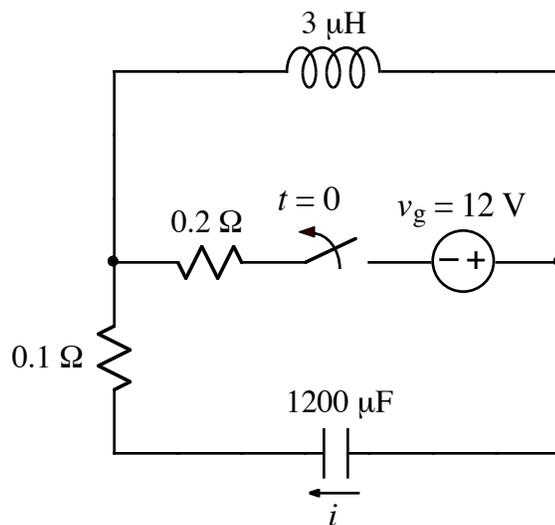
3.

At t $= 0$, $v_g(t)$ switches instantly from $-v_o$ to v_o.

a)   Write the state-variable equations for the circuit in terms of the state vector:

$$\bar{x} = \begin{bmatrix} i_1 \\ i_2 \\ v_1 \end{bmatrix}$$

b)   Evaluate the state vector at $t = 0^+$.

4.

After being closed for a long time, the switch opens at $t = 0$.

a)   State whether $i(t)$ is underdamped, overdamped, or critically damped.

b)   Write a numerical time-domain expression for $i(t)$, $t > 0$, the current through C. This expression must not contain any complex numbers.