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

Give expressions for the following in terms of $i_g, R_1, R_2, L, \text{ and } C$:

\[
\begin{align*}
i(t = 0^+)) \quad \text{and} \quad \left. \frac{di(t)}{dt} \right|_{t=0^+}
\end{align*}
\]

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

\[
\alpha = 1 \text{ Mr/s} \quad \text{and} \quad \omega_0 = 50 \text{ kr/s}
\]
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:

\[
\dot{x} = \begin{bmatrix} i_1 \\ i_2 \\ v_1 \end{bmatrix}
\]

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.