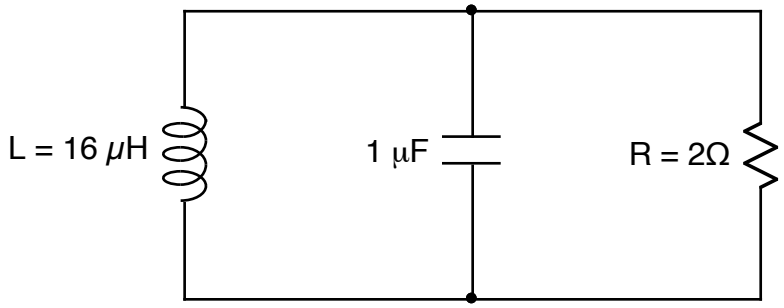
# HOMEWORK #1



1.

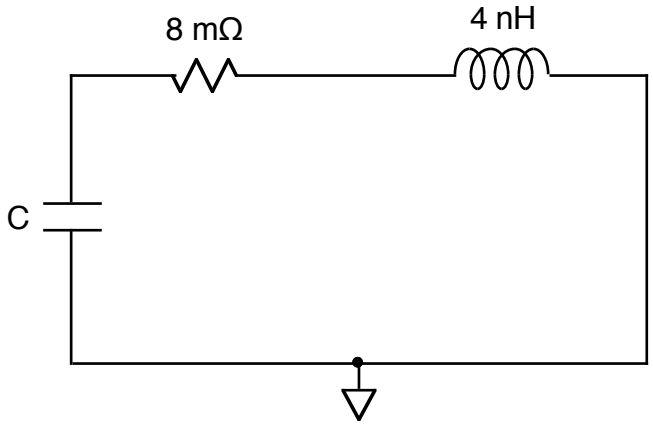



a) Find the characteristic roots, $s_1$ and $s_2$, for the above circuit.

b) If C is reduced to 100 nF, which will the circuit be: overdamped or underdamped?

c) Using the L and C values in the circuit, what value of R yields an underdamped circuit with damping frequency $\omega_d$ = 150 k rad/s?

2.

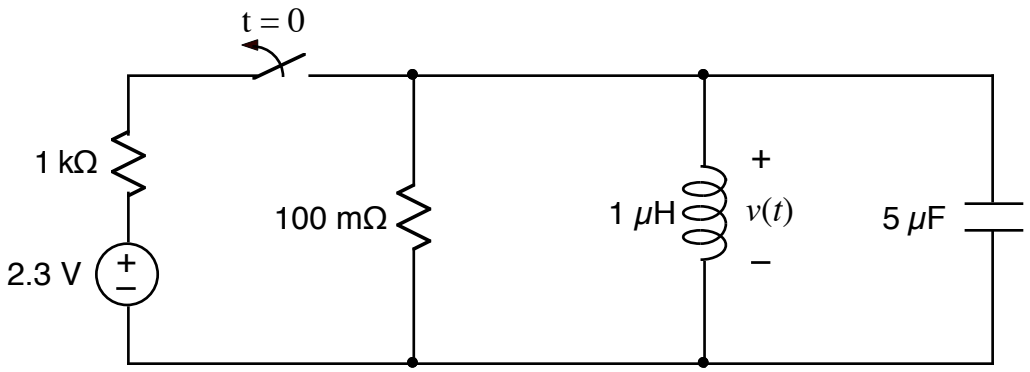



An engineer wishes to build a crude TV jammer circuit for Channel 9 using the above schematic. A 4 nH inductor with an internal resistance of 8 mΩ is available. (The circuit will be driven by an audio-frequency square-wave generator feeding a diode and resistor in series and connected to the top of the capacitor.) The circuit shown is supposed to produce a signal that oscillates at approximately 189 MHz and decays eventually to zero.

a) Find the value of C. Remember to convert Hz to rad/s.

b) Find the value of the damping factor, α.

3.




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

Find $v(t)$ for $t > 0$.