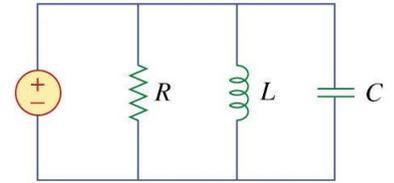


EE303 Problem Set 4

1. (EE301 review) What is the impedance of an $0.01 \mu\text{F}$ capacitor at a frequency of 159.2 kHz . If the frequency is doubled to 318.3 kHz , what is the impedance?

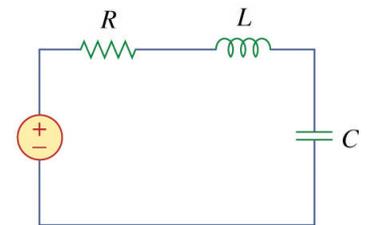
2. Consider the parallel resonant circuit depicted below with $R = 8 \text{ k}\Omega$, $L = 0.2 \text{ mH}$ and $C = 8 \mu\text{F}$.



- Compute the impedance of L and C at $f = 3978.9 \text{ Hz}$.
- What is the combined impedance of L and C in parallel at $f = 3978.9 \text{ Hz}$?

3. Consider the circuit below with $R = 0.314 \Omega$, $L = 1.0 \text{ mH}$ and $C = 25.33 \mu\text{F}$.

- Compute the resonant frequency f_r of this series RLC circuit.
- Determine the quality factor Q .
- Calculate the bandwidth of this circuit.
- Halving the resistance R has what effect on Q ?



4. Suppose we have a series resonant circuit as depicted above. The circuit's resonant frequency $f_r = 400 \text{ kHz}$, the bandwidth $BW = 50 \text{ kHz}$, and $R = 20 \Omega$. Determine the required values of L and C .