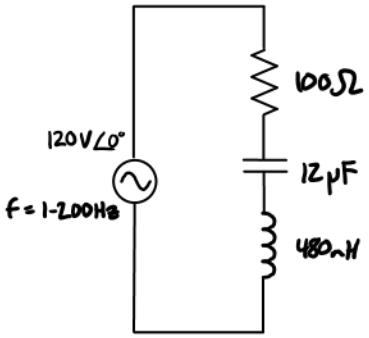
**Series Resonant Circuits (49:56)**

Compare and contrast the electrical properties of capacitors with those of inductors.

Describe how capacitive and inductive impedance relate to each other at conditions of resonance.

Write the formula used to determine the resonant frequency.

Determine the resonant frequency for the series circuit below.




Determine the impedance for each individual element and total impedance for the series circuit above at conditions of resonance. Comment on impedance conditions at resonance.

Determine current and voltage for each element in the above series circuit at conditions of resonance. Comment on electrical properties at conditions of resonance.

Describe how Kirchhoff's Voltage Law accounts for voltage across the reactive components at conditions of resonance.

List the electrical phenomenon that occur at conditions of resonance.

Determine total impedance, source current, and voltage across each component for the above series circuit at a reduced excitation frequency of 30Hz and at an increased excitation frequency of 120Hz.

Comment on the electrical properties observed at excitation frequencies below the resonant frequency.

Comment on the electrical properties observed at excitation frequencies above the resonant frequency.

Compare and contrast electrical properties at resonance with those at below and above the resonant frequency.

Discuss properties that influence power at resonance.

Draw general purpose plots of the following properties as functions of frequency:

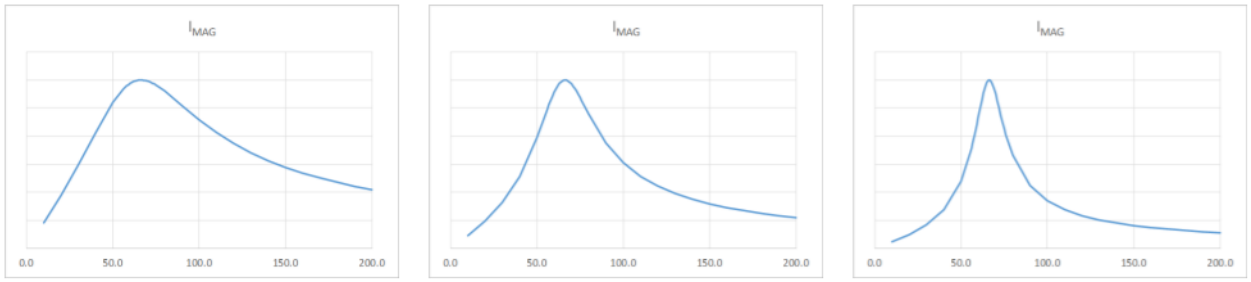
- total impedance magnitude
- total impedance angle
- source current magnitude

source current phase shift

voltage magnitude across each component

Comment on the observed behavior.

Compare and contrast these 3 plots of current as a function of frequency.




Define selectivity.

Identify the current experienced by resonant circuits at the half power condition.

Identify the two formulas used to solve for the lower and upper half power frequencies, $f_1$ and $f_2$.

Determine the lower and upper half power frequencies for the above series circuit.

Determine the electrical properties of the above series circuit at the lower and upper half power frequencies.

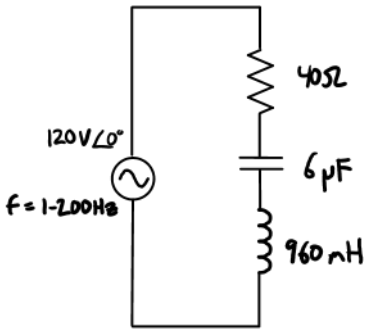
Define bandwidth.

Determine bandwidth for the above series circuit. Is bandwidth symmetric about the resonant frequency for this particular circuit?

Define quality factor. Identify the means of calculating quality factor.

Identify how quality factor can be used to calculate other electrical properties.

Given the series circuit below, determine the resonant frequency and determine electrical properties of this circuit at conditions of resonance specifically total impedance, source current, voltage across the resistor, capacitor, and inductor, bandwidth, quality factor, and the lower and upper half power frequencies.



Identify how component values affect quality factor.

Illustrate how circuits with different resistor values influence the selectivity of a series resonant circuit.

Illustrate how circuits with different inductor and capacitor ratios influence the selectivity of a series resonant circuit.