LCR Series and Parallel Circuits

Spoken Tutorial Project
https://spoken-tutorial.org
National Mission on Education through ICT

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We will learn to,

Learning Objectives

We will learn to,

▶ **Buid LCR circuits in series and parallel combination**

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We will learn to,

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▶ **Calculate the resonance frequency from the graph and formula**

System Requirement

- **Windows 11**

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- **Google Chrome v123.0.63**

Learners should be familiar with topics in,

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▶ **Simple AC circuits**

The frequency at which

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▶ **Impedence of the LCR circuit becomes minimum**
or

The frequency at which

▶ **Impedence of the LCR circuit becomes minimum**

or

▶ **Current in the circuit becomes maximum**

Resonance Frequency

▶ **Resonance frequency(ν) is given by**

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► $\nu = \frac{1}{2\pi\sqrt{LC}}$

Link for PhET Simulation

▶ **Please use the given link for the Circuit construction kit: AC Virtual Lab**
https://phet.colorado.edu/en /simulations/circuit-construction- kit-ac-virtual-lab

LCR Series Circuit

Frequency (Hz)	Current (A)
0.1	0.56
0.12	0.66
0.14	0.74
0.16	0.8
0.18	0.86
0.2	0.89
0.22	0.89
0.24	0.92
0.26	0.88
0.28	0.86
0.3	0.83
0.32	0.81
0.34	0.77
0.36	0.73
0.38	0.7
0.4	0.68

LCR Series Circuit
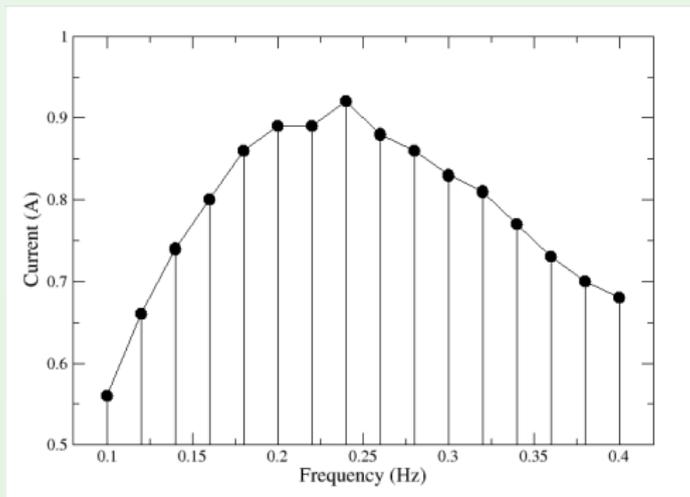
From graph Current has maximum value at 0.24 Hz frequency

LCR Parallel Circuit

Frequency (Hz)	Current (A)
0.1	0.75
0.12	0.7
0.14	0.63
0.16	0.56
0.18	0.52
0.2	0.48
0.22	0.45
0.24	0.44
0.26	0.46
0.28	0.5
0.3	0.54
0.32	0.57
0.34	0.61
0.36	0.63
0.38	0.65
0.4	0.67

LCR Series Circuit
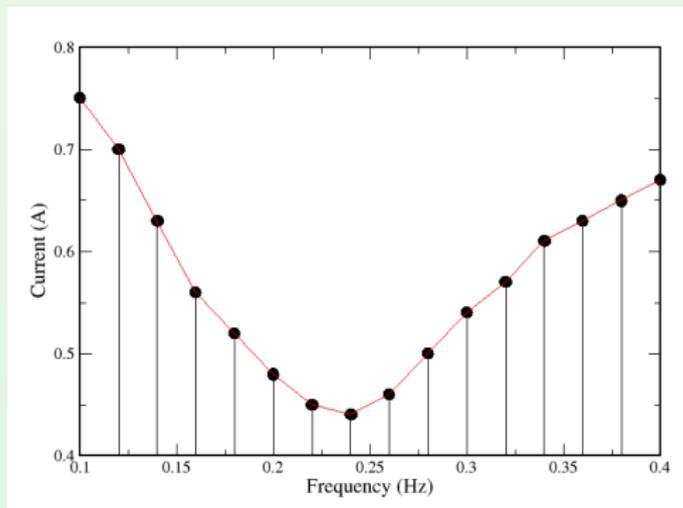
From graph Current has minimum value at 0.24 Hz frequency

In LCR series and parallel circuits,

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In LCR series and parallel circuits,

▶ **Inductance, L = 5 H**

▶ **Capacitance, C = 0.1 F**

▶ **Resonance frequency,**

$\nu = \frac{1}{2\pi\sqrt{5\times0.1}}$

$\nu = 0.225$ **Hz**

Summary

Using this simulation we have,

▶ **Built LCR circuits in series and parallel combination**

▶ **Calculated the resonance frequency from the graph and formula**

► **Change the inductance to 7 H and capacitance to 0.2 F**

► **Calculate the resonance frequency**

Assignment 2

▶ **Change the resistance values to 5 ohms and 15 ohms**

▶ **Find the variation of current with frequency**

Spoken Tutorial Project

▶ **The video at the following link summarises the Spoken Tutorial Project** **https://spoken-tutorial.org /What_is_a_Spoken_Tutorial**

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▶ **Please download and watch it**

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▶ **Visit https://forums.spoken-tutorial.org**

▶ **Choose the minute and second where you have the question**

▶ **Explain your question briefly**

▶ **The Spoken Tutorial project will ensure an answer**

You will have to register to ask questions

The `Spoken Tutorial` **project was established by the** `Ministry of Education`**, Govt. of India**

Thank You!

▶ **This tutorial is contributed by Dr. Jagdish Kaur and Amardeep Kaur from DAV College Amritsar**

▶ **Thank you for joining**