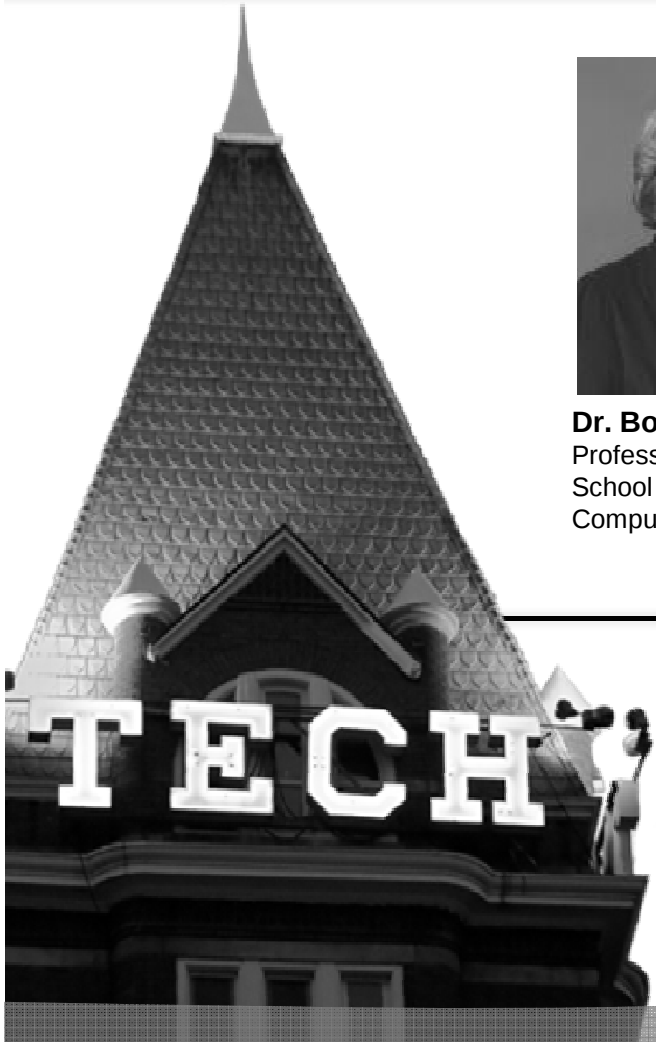


Linear Circuits



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Computer Engineering



An introduction to linear electric components and a study of circuits containing such devices.

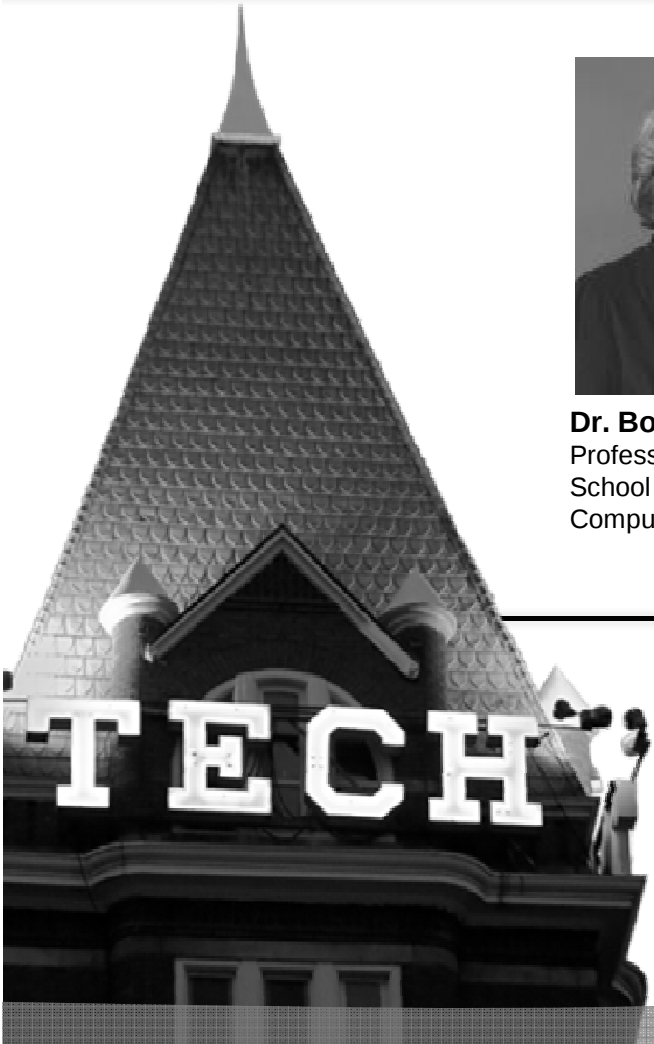
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Bandpass and Notch Filters



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Computer Engineering

Show schematics and characteristics of notch and bandpass filters



Module 4:

- ⦿ Sinusoids and Phasors
- ⦿ Impedance
- ⦿ AC Circuit Analysis
- ⦿ Transfer Functions
- ⦿ Frequency Spectrum
- ⦿ Frequency Response
- ⦿ Filtering

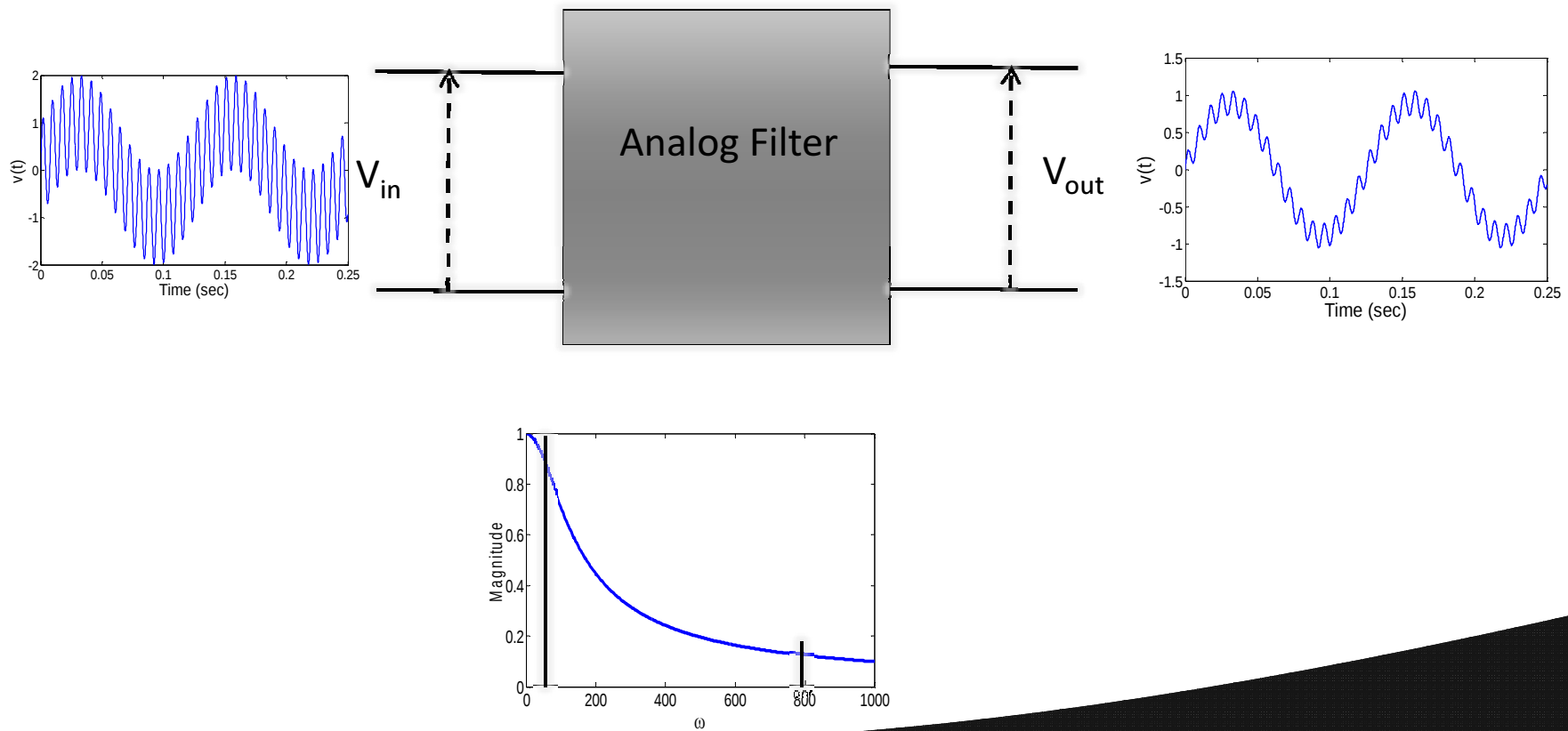
Previous Lesson

- © Introduced lowpass and highpass filters

Lesson Objective

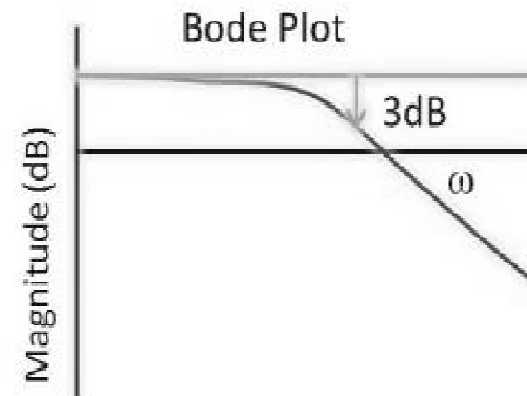
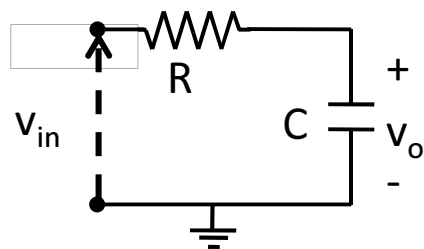
- © Introduce characteristics of notch and bandpass filters

Analog Filters

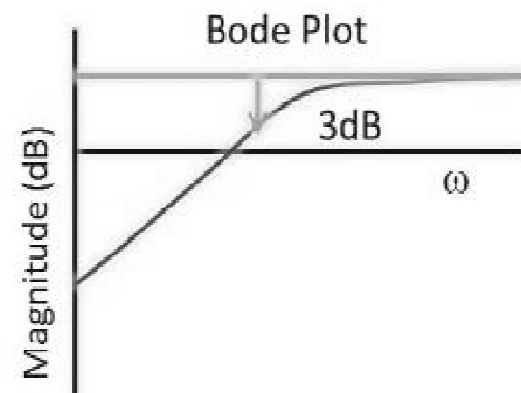
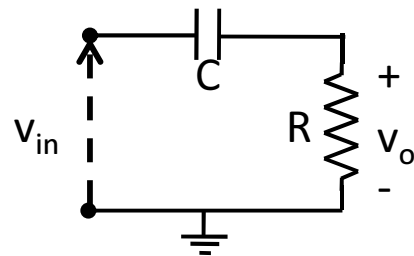


Summary of RC Filters

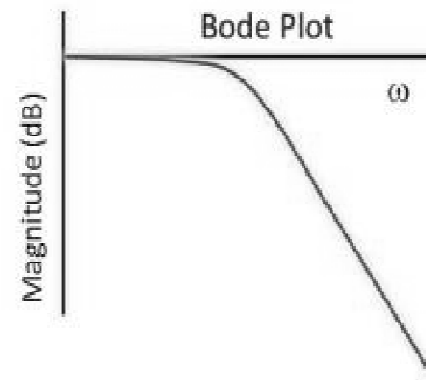
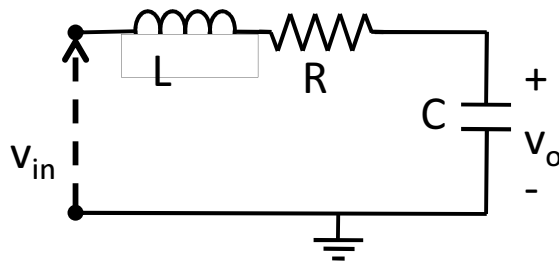
RC Lowpass:



RC Highpass:

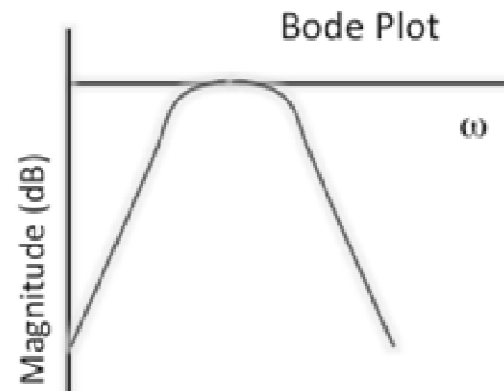
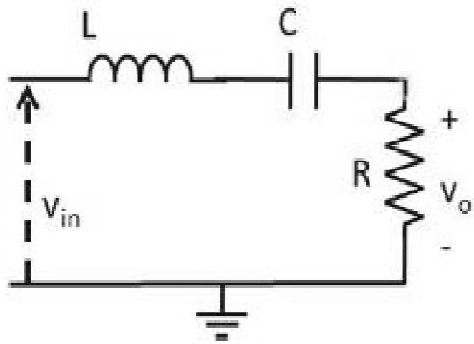


RLC Lowpass Filter



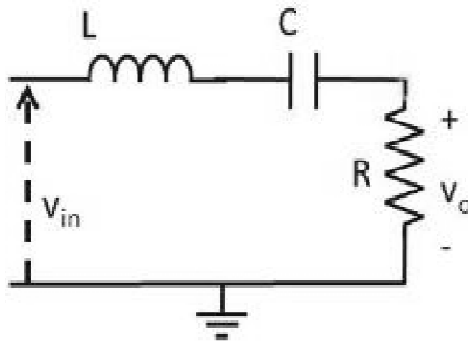
$$H(\omega) = \frac{1}{(1 - LC\omega^2) + RCj\omega}$$

RLC Bandpass Filter



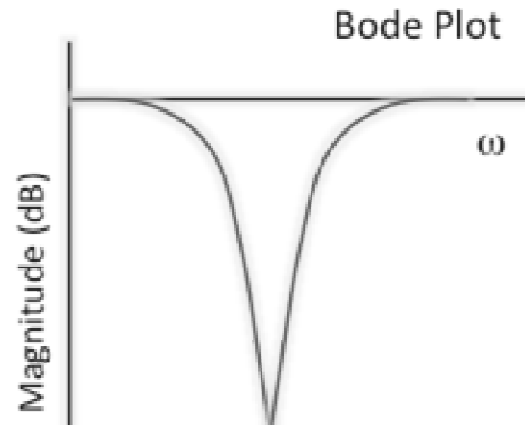
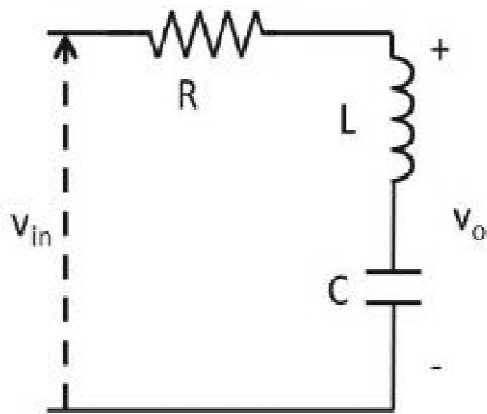
$$H(\omega) = \frac{RCj\omega}{(1-LC\omega^2) + RCj\omega}$$

Example Bandpass Filter



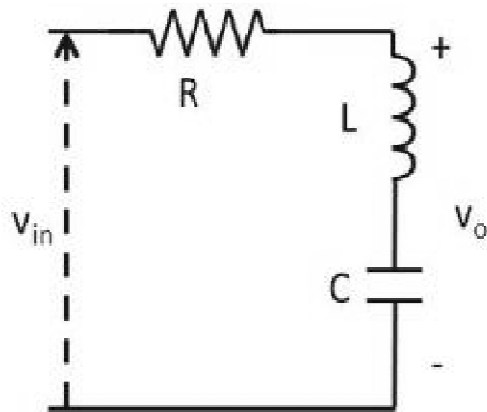
$$H(\omega) = \frac{RCj\omega}{(1 - LC\omega^2) + RCj\omega}$$

Notch RLC Filter



$$H(\omega) = \frac{1 - LC\omega^2}{(1 - LC\omega^2) + RCj\omega}$$

Example Notch Filter



$$H(\omega) = \frac{1 - LC\omega^2}{(1 - LC\omega^2) + RCj\omega}$$

Summary

- ⦿ Different filter characteristics can be found from RC and RLC circuits
- ⦿ Bandpass filter passes frequencies in a band
- ⦿ Notch filter rejects frequencies in a band

Next Lesson

- © Lab demo filters on the guitar string experiment