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# Introduction to Electronics

*An introduction to electronic components and a study of circuits containing such devices.*



TECH

# Review of Transfer Functions



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*Review of transfer functions for characterizing circuits*

**TECH**

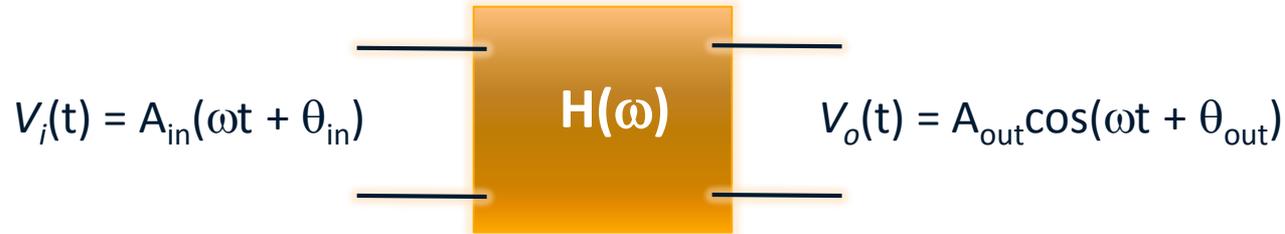
# Previous Lesson

- ⦿ Review of impedance

# Lesson Objectives

- Review transfer functions
  - To characterize a circuit
  - To find frequency response curves

# Transfer Function Two-Port Networks

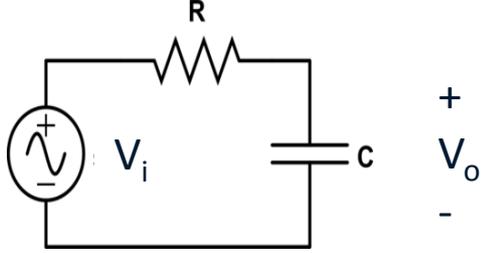
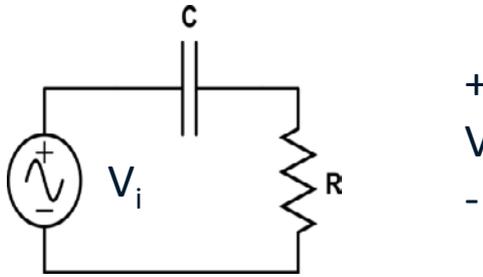
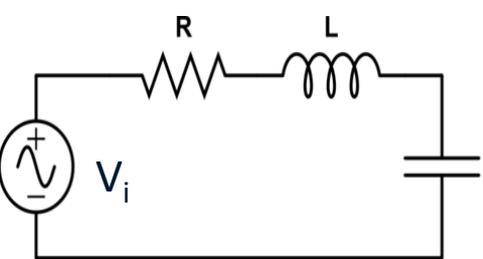


$$H(\omega)V_i = V_o$$

$$H(\omega)A_{in} \angle \theta_{in} = A_{out} \angle \theta_{out}$$

$$A_{out} = |H(\omega)|A_{in} \quad \theta_{out} = \angle H(\omega) + \theta_{in}$$

# Summary of Simple Circuits

|   |  |
|---|--|
|  <p>Circuit diagram showing an AC voltage source <math>V_i</math> connected in series with a resistor <math>R</math> and a capacitor <math>C</math>. The output voltage <math>V_o</math> is measured across the capacitor.</p>                               | $H(\omega) = \frac{1}{1 + RC\omega j}$               |
|  <p>Circuit diagram showing an AC voltage source <math>V_i</math> connected in series with a capacitor <math>C</math> and a resistor <math>R</math>. The output voltage <math>V_o</math> is measured across the resistor.</p>                                | $H(\omega) = \frac{RC\omega j}{1 + RC\omega j}$      |
|  <p>Circuit diagram showing an AC voltage source <math>V_i</math> connected in series with a resistor <math>R</math>, an inductor <math>L</math>, and a capacitor <math>C</math>. The output voltage <math>V_o</math> is measured across the capacitor.</p> | $H(\omega) = \frac{1}{1 - \omega^2 LC + RC\omega j}$ |

# Summary

- Defined transfer function for Two-Port Networks
  - Showed transfer functions of simple circuits

# Next Lesson

- Review of Frequency Responses