Notes for ECE 20001 - Electric Engineering Fundementals I

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Contents

Course Introduction

This course covers fundamental concepts and applications for electrical and computer engineers as well as for engineers who need to gain a broad understanding of these disciplines. The course starts by the basic concepts of charge, current, and voltage as well as their expressions with regards to resistors and resistive circuits. Essential concepts, devices, theorems, and applications of direct-current (DC), 1st order, and alternating-current (AC) circuits are subsequently discussed. Besides electrical devices and circuits, basic electronic components including diodes and transistors as well as their primary applications are also discussed. For more information, see the syllabus.

Equations

1. Coulomb's Law: $\vec{F} = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2}\hat{r}$

Charge, current, voltage, and power

Charge: A fundemental property of matter.
Current: The rate of flow of charge.
Voltage: Related to the potential energy of charges.
Power: The rate of doing work, or changing energy