Lecture 3: September 5th, 2001

Circuit Concepts and Laws

A) Electric circuit
B) Kirchhoff's laws
C) Battery as an example element

Reading:
Schwarz and Oldham 1.2 – 1.4, 2.1-2.2, pp. 88-89, examples 3.9 and 3.10 pp. 100-101

Summary

- Example circuit similar to Fig. 1.8 with elements
- Ideal wires have no voltage change or stored charge
- Example resistor I = V/R (Amps = Volts/Ohms)
- Kirchhoff's current law (KCL): sum of currents entering a node is zero. (charge can only be stored in elements)
- Kirchhoff's voltage law (KVL): sum of voltages around a loop is zero. (return to same point and hence same potential)
- Car battery model: ideal 12 volt source with 0.1 ohm series resistance
- I versus V plot for car battery: easiest points to find are 1) when I is zero and V = open circuit voltage and 2) when V = 0 and I is the short circuit current.
- Thevenin : showed any circuit with ideal voltage and current sources and resistors has a straight line I-V plot.