EECE.2160: ECE Application Programming

Programming Assignment #2: Basic I/O and Operations

Figures

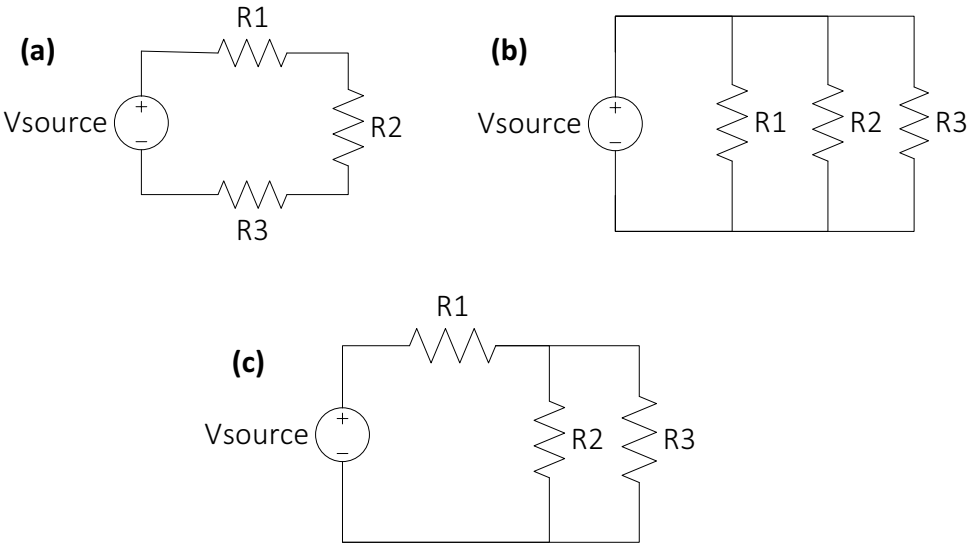


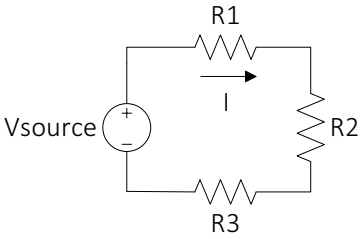
Figure 1: Basic three-resistor circuits, showing **(a)** all three resistors in series, **(b)** all three resistors in parallel, and **(c)** two of the resistors in parallel, with a third in series with each.

Circuit Analysis Supplement

The basic equations needed for this program are shown below in Figure 2. For more details on the analysis of series/parallel circuits, contact your instructor directly.

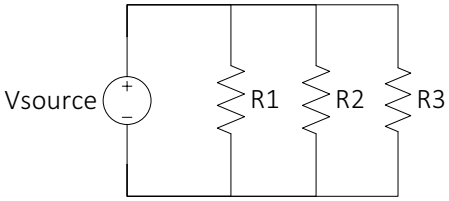
In all cases, given x = 1, 2, or 3:
Vx = voltage drop across resistor Rx
(for example, V1 = voltage across R1)
Ix = current through resistor Rx
(for example, I3 = current through R3)

SERIES CIRCUIT



R_{total} = R1 + R2 + R3
I = Vsource / R_{total}
= I1 = I2 = I3 *(all currents equal)*
Vx = I * Rx

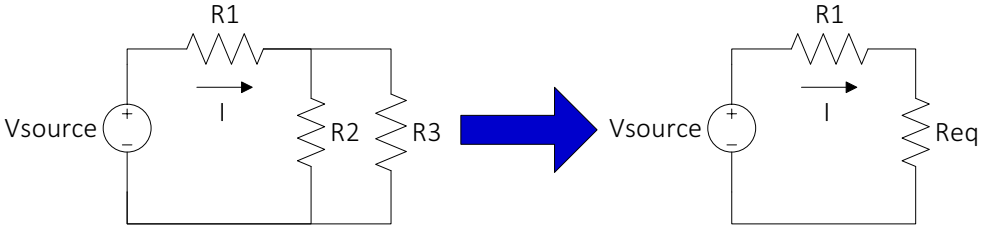
PARALLEL CIRCUIT



Vsource = V1 = V2 = V3 *(voltage across all resistors equal)*
Ix = Vsource / Rx

SERIES/PARALLEL COMBINATION

To solve for all voltages/currents, convert the original circuit to the equivalent circuit on the right



Req = single resistance equivalent to parallel combination of R2, R3
= (R2 * R3) / (R2 + R3)
I = Vsource / (R1 + Req)
Veff = I * Req

V1 = I * R1
V2 = V3 = Veff *(voltage across parallel resistors is the same)*
I1 = I
I2 = Veff / R2
I3 = Veff / R3

Figure 2: Circuit diagrams with equations for analyzing each circuit