Mixed Electronics II

Tentative Plan: Install Vivado from Xilinx. (Spartan)

- 3 Projects
- No lectures
- Keep lab books
- 1-2 pages weekly reports on progress

Project 1: Weigh scale using strain gauges
Start with analysis of a bridge circuit

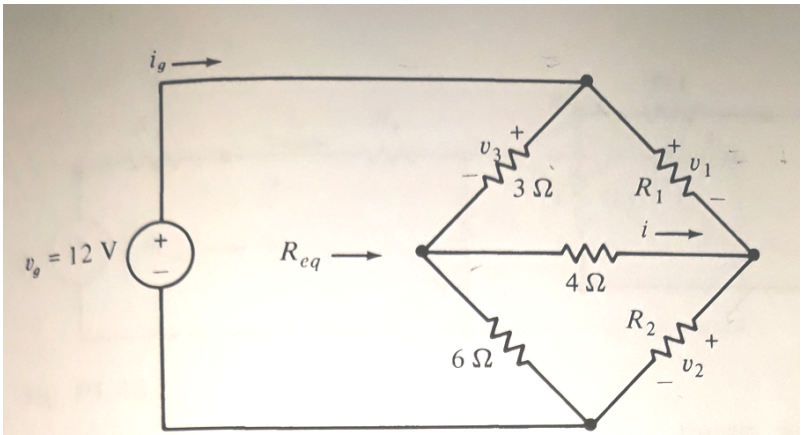

Fig. P1.38

1.38 Shown in Fig. P1.38 is a non-series-parallel connection known as a **bridge circuit**.

(a) Given that $R_1 = 6\ \Omega$, $R_2 = 3\ \Omega$, and $v_1 = 7$ V, find v_2, i, v_3, and the resistance $R_{eq} = v_g/i_g$ seen by the voltage source.

(b) Repeat part (a) for the case $R_1 = 3\ \Omega$, $R_2 = 6\ \Omega$, and $v_1 = 4$ V.

(c) When the current $i = 0$, we say that the bridge is **balanced**. Under what condition (find an expression relating R_1 and R_2) will this bridge be balanced?

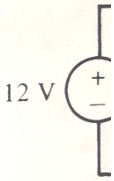

Fig. P1.

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a) Solve problem 1.38
b) Test the circuit
c) Use the circuit to measure a resistance
d) How would you use strain gauge(s) in the circuit to Measure weights
e) Use strain gauge(s) to build a scale
f) If needed, use an amplifier (which type?) to get better measurements.
g) Connect it to a computer and display the weight values.

How would you use strain gauge(s) to implement a scale

FPGAs. Install Vivado from Xilinx