Lab 21 and 22

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Test plan

- An DAC and a buffer was used to vary the load current through the sense resistor
- A differential reading was made with an ADC across a sense resistor to test Thevenin resistance
- A second differential reading was made across a basic voltage divider to ensure that the voltage source remained linear.
- The differential readings were used to create a Thevenin resistance curve for multiple power supplies

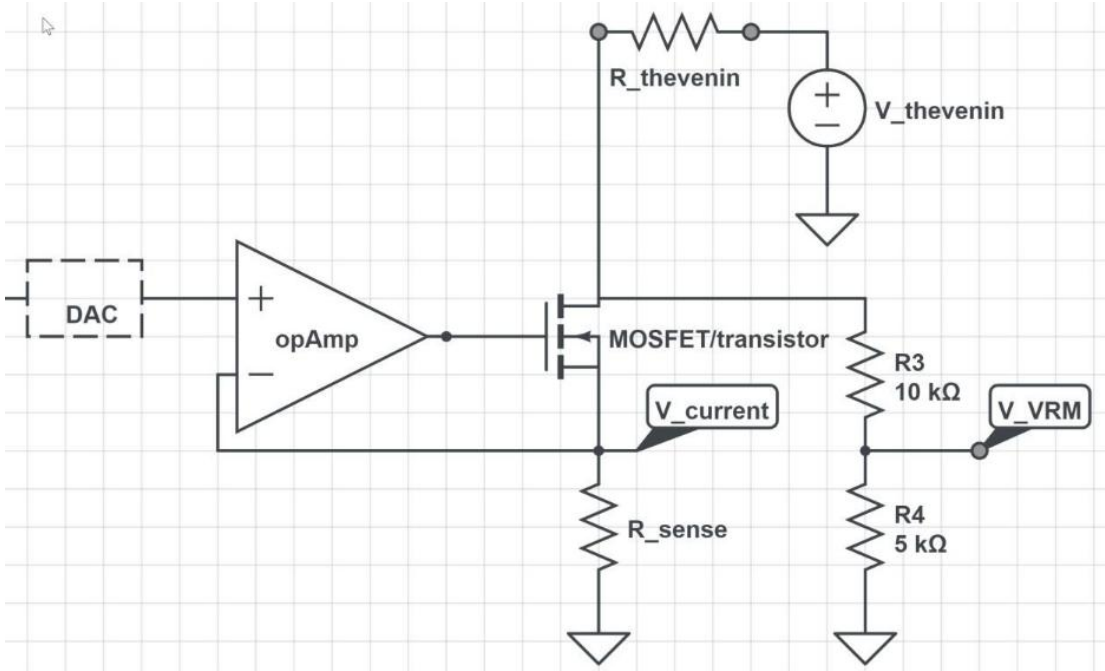

Figure 1: Basic schematic excluding microcontroller

Test setup

- Four voltage sources were tested:
  - Two waveform generators
    - Keysight DSOX1102G Oscilloscope, High-Z, 5V
    - Keysight 33500B Waveform generator, 99.99% duty cycle, 10Vpp
  - Two power supplies
    - 9V w/ 5V LDO (AMS1117)
    - Keysight EDU36311A DC Power Supply, 6V

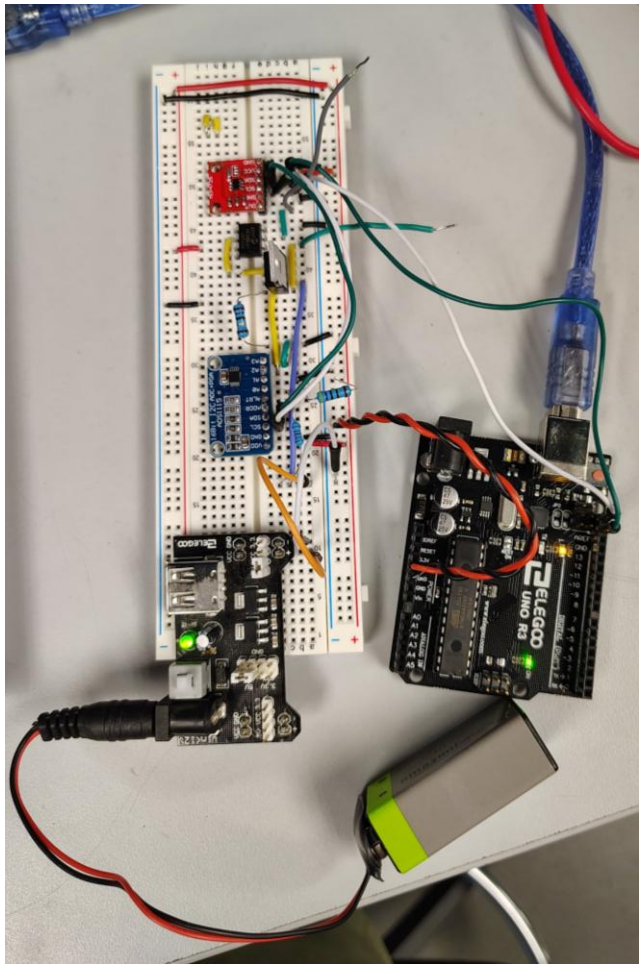

Figure 1: 9V with AMS1115 LDO test setup

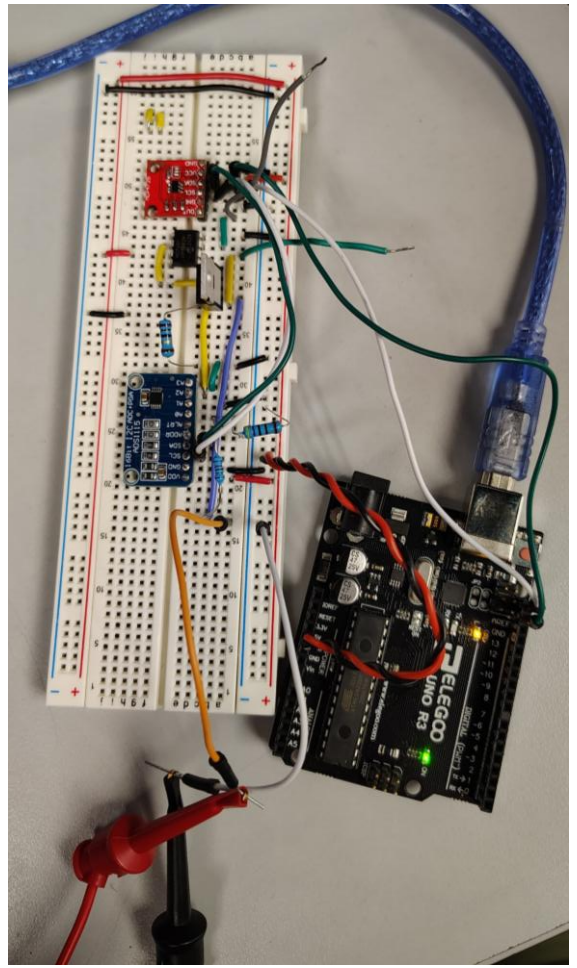

Figure 1: Oscilloscope, waveform generator, and DC Power Supply test setup

Results

- Four power sources were tested.
- Waveform generators like the waveform generator and the oscilloscope had high Thevenin resistances (~2kΩ)
- Power supplies had lower Thevenin resistances (~40Ω)
- Thevenin resistance was fairly constant over the entire test current range, though it was less constant at low currents.