### Battery Model ([1])

The following model represents the battery as a third-order electrical circuit. It is nearly equivalent to that in [1], but it was modified so that current was an internal state of the model and the source current was replaced with a source voltage. These changes were made to easily account for the thermal losses across .

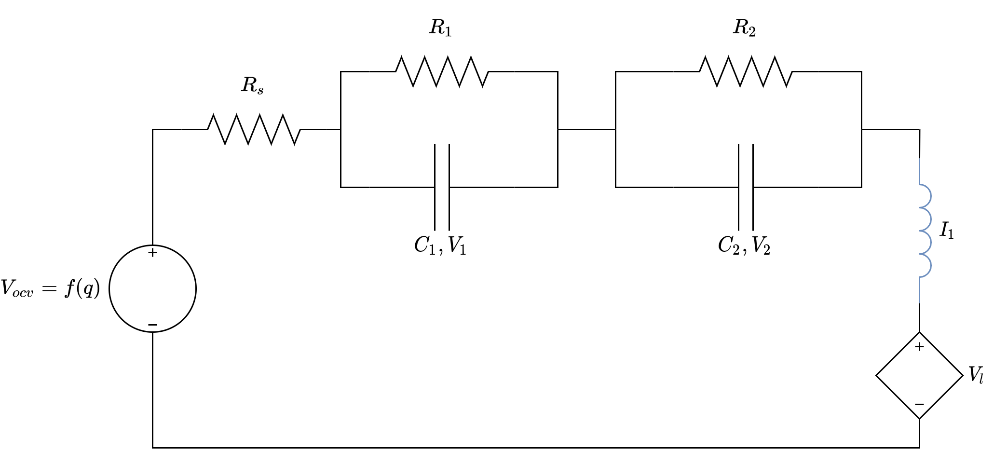


Figure 3: Battery Component Model



In Equation 1.4, are capacitances and resistances found from experimental parameter identification,  is the battery capacity (Coulombs in SI), is the battery state of charge (SOC), is the open circuit voltage (OCV), and is the pack’s current demand [1]. is the voltage of the load connected to the battery.

A picture containing graphical user interface

Description automatically generated

Figure 4: Battery Graph Model



## Appendix:

[1] C. T. Aksland, “MODULAR MODELING AND CONTROL OF A HYBRID UNMANNED AERIAL VEHICLE’S POWERTRAIN,” M.S., University of Illinois at Urbana-Champaign.