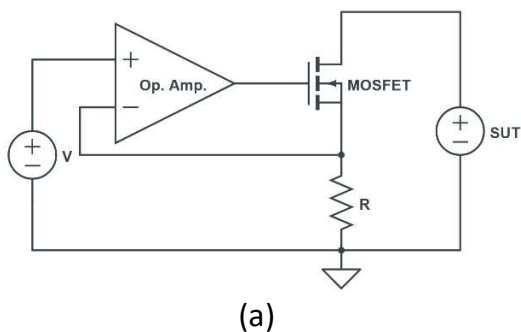


# Undergraduate Research Project Proposal

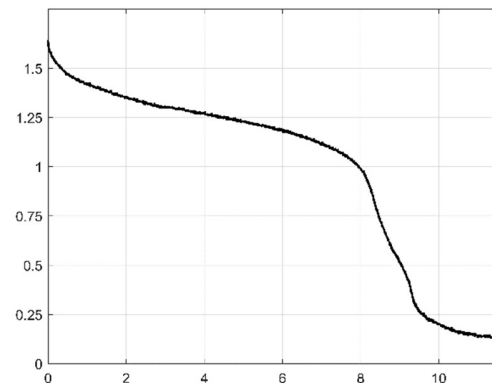
## Design and modelling of electronic loads

Electronic loads are specialized circuits, that can be found commercially available, and complement power supplies in their functionality, by drawing power from connected circuits in a controlled manner. In other words, they are circuits that behave as feedback-controlled power resistors. As such, they are valuable for analysing various power supplies. Electronic loads can operate in different modes: constant resistance, constant current, constant voltage, constant power, and hybrid variations. Each mode having a different application.

Despite their widespread use, electronic loads lack comprehensive literature exploration. This proposal aims to enhance understanding by: suggesting improvements in already existing circuits or proposing new circuits and providing a clear mathematical models to explain their behaviour. The developed circuits will be simulated, built and tested in typical application scenarios to verify their functionality and validate the proposed mathematical models. Typical applications include acquiring battery discharge curves, assessing stability/noise in switch mode power supplies and many others.



(a)



(b)

Fig. 1 – The fundamental analog circuit responsible for constant current mode in (a). In (b) a AA battery discharge curve (voltage x time) obtained from circuit (a) using the battery as a supply under test (SUT).

**Special requirements:** LTspice or similar simulation software. No ethical approval is required.

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