Faculty of Electrical Engineering & Computer Science
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Evaluation of Theoretical and Empirical Methods for Estimating SOC and SOH and Analysis of Experimentally Gathered Results for Enhancing Batteries Lifespan.

ABSTRACT - Masterthesis

Renewable energy has become a goal for many nations. One bottleneck is energy storage, as the peak time energy harvesting is not necessarily the same of energy consumption. Battery is the widely used energy storage device. Li-ion cells are widely used for many applications like hybrid vehicles, cell phones, laptops and as renewable energy storage for use at later times due to their high energy density and slow loss of charge when unused state. New application domains have placed greater emphasis on the battery energy management, monitoring and control strategies. Battery management system is the necessary and important to maintain the cells in the battery pack to operate within SOA (safe operating area), maximizing the life time as well as the performance of the battery.

In this thesis, study between different SOC (state of charge) and SOH (State of health) methods as well as the cell life maximization techniques will develop. Open Circuit Voltage (OCV) and the Coulomb Counting methods will be used to estimate SOC and the SOH of the battery. Combination of Open circuit voltage and the Coulomb Counting methods will be used to improve the efficiency of the estimation, as well as to overcome the drawbacks of the individual methods. Along with the SOC and SOH estimation several tests will be done to improve the lifespan of the battery.