

# The Study of Lithium Ion Battery Management System for Hybrid Electric Vehicle

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## ABSTRACT

The main purpose of this study is to obtain accurate battery State-of-Charge (SOC) and send it to the controller of power and electric energy management. The Li-ion batteries are managed by these procedures. Vehicle used motor driving as the battery SOC is full, when battery SOC is not enough, used engine driven generator which electric energy controller charge and balance to battery pack. Then set up a battery model method. Develops a battery model simulate battery states in the any test load. Apply the LabVIEW software user interface to construct an automatic measurement system for the test platform. Through a series test, the experimental data can be used to identify the parameters of Li-ion module for ADVISOR 's RC model and analyze battery performance. Use the measurement system to record the experimental data in charging or discharging condition. Establish ADVISOR 's RC model to simulate battery states in the any load. This method can add safety and reduce cost of experimentation. The verify experimentation platform main comprises three parts: (1) an integrated motor/ generator of DC 48V (2) Li-ion batteries capacity is 8.4Ah of 48V and (3) an internal combustion engine of 150c.c. Three parts to make up a parallel hybrid electronic vehicle system. Applying the single chip (8051) is designing battery SOC measurement unit. There are two purposes of SOC control module. (1) It can provide a SOC signal to HEV system controller. (2) It can display an accurate SOC information to driver. This study proposes a method for estimating battery SOC that use in hybrid electronic vehicle. The measurement of the used initial capacity is based on the open-circuit voltage measurement for before vehicle drive. The measurement of the used capacity is based on the improved coulomb counting, which compensates the effects of output current for vehicle driving. Apply the single chip (8051) to implement the estimated SOC of battery. By a series experiments the estimated SOC of battery is smaller than 10%.

Keywords : Hybrid electronic vehicle, State of Charge, Li-ion battery model, LabVIEW

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