Performance Analysis of SOC Estimation Approaches for Lithium-Ion Batteries

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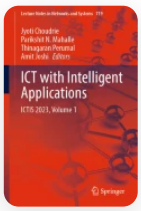

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Abstract

The state of charge (SOC) is an important parameter in electric vehicles to be measured accurately from the battery model parameters and is used to determine the amount of charge left in the battery for future use. The model parameters of the battery are found to vary with change in temperature, charging/discharging rates, aging and environmental conditions. The existing SOC estimation approaches such as “coulomb counting”, “electrochemical impedance

spectroscopy (EIS)" and observer based techniques are suitable only for offline applications. Hence, SOC estimation by these methods are inaccurate because the variation in battery model parameters in real time are not considered. In this paper, an adaptive SOC estimation approach employing real time battery parameters identification and online updating observer is proposed. The accuracy and performance of the proposed approach is validated through simulation and compared with the existing approaches.

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