

Lithium-Ion Battery State of Charge Estimation Using One State Hysteresis Model with Nonlinear Estimation Strategies

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Abstract : Battery state of charge (SOC) estimation is an important parameter as it measures the total amount of electrical energy stored at a current time. The SOC percentage acts as a fuel gauge if it is compared with a conventional vehicle. Estimating the SOC is, therefore, essential for monitoring the amount of useful life remaining in the battery system. This paper looks at the implementation of three nonlinear estimation strategies for Li-Ion battery SOC estimation. One of the most common behavioral battery models is the one state hysteresis (OSH) model. The extended Kalman filter (EKF), the smooth variable structure filter (SVSF), and the time-varying smoothing boundary layer SVSF are applied on this model, and the results are compared.

Keywords : state of charge estimation, battery modeling, one-state hysteresis, filtering and estimation

Conference Title : ICLB 2017 : International Conference on Lithium Batteries

Conference Location : Miami, United States

Conference Dates : March 09-10, 2017