State of Charge estimation of lithium-ion power battery based on online parameter identification method and BP neural network

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The accurate estimation of power battery state of charge (SOC) is of great significance to vehicle driving safety and energy management. In this paper, the second-order RC equivalent circuit model is used, the recursive least square method with forgetting factor (FFRLS) is used for online parameter identification, and the extended Kalman filter (EKF) is used for SOC estimation. The off-line data charging and discharging under each working condition of the battery are used as training data, the BP neural network is used for training, and the estimation error of the extended Kalman filter is used as the training output of the neural network to compensate for the error of the extended Kalman filter. FFRLS and EKF are used to ensure the real-time performance of the system, and FFRLS and BP neural networks are used to improve the robustness of the system. It is proven through simulation that this method can effectively improve the accuracy of SOC estimation.

FULL TEXT