Study of High Voltage Li-ion Batteries Equalization Technologies for Hybrid Electric Vehicle

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ABSTRACT

The purpose of this study for high voltage lithium batteries running in series-connected. Because of the batteries ’ s charge or discharge characteristics, degree of aging, and increase the number of times to employ that result in the electricity unbalance and make overcharge or deep discharge, so can not fully utilize the save power of battery, even shorten the life of battery and affect the detection accuracy of SOC. In order to improve the tandem battery life and accuracy of estimated SOC. This study is divided into three parts：⑴ To develop a suit lithium battery performance experimental platform for different discharge conditions and contextual temperature, data record for charge and discharge process analysis of battery to constitute database of lithium battery performance by relations of multi-input and output to establish neural network lithium battery model for estimate the lithium battery capacity. ⑵ To set battery ’ s performance and model parameter, establish lithium battery RC model that arrange in groups from ADVISOR built-in state of Hybrid Electric Vehicle road trip with series-connected batteries by real vehicle simulation. ⑶ To develop one of series-connected batteries equalization mechanism, run in four lithium batteries in series-connected doing charge, stand and discharge from pattern equalization model so that each battery have the same capacity. In this study, to upgrade errors of lithium battery capacity control estimation within ±1 %. By simulation of ADVISOR Hybrid Electric Vehicle that can reduce the cost of real vehicle experiment. Series-connected batteries equalization that avoid to happen overcharge or deep discharge conditions and upgrade estimation accuracy of SOC for series-connected batteries.

Keywords : Series-connected batteries equalization、Battery performance、Neural network

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