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Design of State of Charge Estimation Method for Battery Management System of Electric Vehicle

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Abstract: Environmental pollution and energy issues are becoming increasingly significant today. Due to its high energy density and extended cycle life, Li-ion batteries are frequently employed in electric cars. An essential indication for Li-ion batteries is their state of charge (SOC). The safe functioning of a Li-ion battery may be ensured by an accurate SOC estimation.

In a future where electric mobility is defining our way of life, electric storage is essential, especially in applications like electric automobiles. Although there are many other battery technologies, lithium-ion technology now dominates the market because of its superior performance. To maintain the security of these components, a battery management system (BMS) must be utilised to ensure safe and effective functioning. This system's fundamental function necessitates accurate state of charge (SOC) calculation. The state of charge (SoC), which reflects the capacity of the battery, is one of the most important states that must be monitored in order to improve performance and extend battery life.

In this study, a Kalman filter-based MATLAB programme for estimating state of charge (SOC) was presented.In order to concentrate on the impact of temperature on SOC, the temperature coefficient is suggested in this study. The battery can be represented in state space by adding a temperature coefficient to the current battery model. For state of charge estimation, an Extended Kalman Filter (EKF) is used to increase precision. The findings demonstrate the impact of temperature on the battery's open circuit voltage (OCV) and state of charge (SOC) after the suggested model has been applied in the MATLAB environment.

Keywords: state of charge

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