Optimal charging strategies in lithium-ion battery

This paper deals with optimal charging versus aging minimization for lithium-ion batteries. The optimal charging strategy proposed involves charging controllers whose design relies on a battery ... Expand

This work investigates the possible use of optimal control strategies for charging. We focus on the minimum time charging problem, where different constraints on internal battery states are considered.

Recently, tremendous efforts have been taken toward efficient and health-aware charging of commercial Li-ion batteries. Those charging methods can be directly divided into two categories, namely, passive charging and active charging according to whether the

Paper [] studies the charging strategies for the lithium-ion battery using a power loss model with optimization algorithms to find an optimal current profile that reduces battery energy losses and, consequently, maximizes the charging efficiency.

Three detailed case studies are conducted here to better understand the impact of battery aging status on the proposed optimal charging strategies, 1) optimal charging for a fresh battery, or a battery at its beginning of life, 2) optimal charging for a fully aged

Developing a fast and safe charging strategy has been one of the key breakthrough points in lithium battery development owing to its range anxiety and long charging time. The majority of current model-based charging strategies are developed for deterministic systems.

The article initially examines various common charging strategies, followed by an in-depth exploration of the effects of multi-level fast charging strategies on battery life, charging efficiency, charge capacity, charging speed, and temperature rise.

Abstract: Fast charging is crucial for applications of lithium-ion batteries in energy power systems (e.g., electric vehicles, and portable electronic devices). In this paper, a novel optimal charging strategy based on the model predictive control (MPC) considering lithium plating and cell temperature rise is proposed.

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Battery charging techniques are critical to enhance battery operation performance. Charging temperature rise, energy loss, and charging time are three key indicators to evaluate charging performance. It is imperative to decrease temperature rise and energy loss

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