



***Controlling the charging & discharging for  
lithium-ion battery in microgrid applications:  
A fuzzy-based approach***

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*DOI: <https://doi.org/10.5281/zenodo.8149672>*

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## **Abstract:**

This paper presents a fuzzy-based approach for designing a controller of charging-discharging for lithium-ion batteries in microgrid applications. The goal is to enhance the efficiency and performance of battery systems within microgrids. The proposed controller utilizes fuzzy logic techniques to handle uncertainties and imprecise information, providing robust and adaptive control in real-time scenarios. The controller's fuzzy rules consider factors namely, battery state of charge, load demand, and renewable energy availability to determine optimal charging and discharging strategies. Simulation results demonstrate the effectiveness of the fuzzy-based controller in improving battery utilization, ensuring stable microgrid operation, and enhancing overall system performance. This research contributes to the advancement of battery control strategies in microgrids, promoting more efficient and sustainable energy management systems.

## **Keywords:**

fuzzy logic, charging & discharging controller, microgrid applications, efficiency, performance, robust control, adaptive control, battery state of charge, load demand, renewable energy, optimal strategies, simulation results, system performance, energy management, lithium-ion battery.