

# FUZZY CONTROL ENERGY STORAGE CAPACITY OPTIMIZATION



Does fuzzy logic control support microgrid frequency? This paper proposes an optimal control strategy based on fuzzy logic control (FLC) to support the microgrid (MG) frequency. In addition to frequency regulation, this strategy includes supplementary control units to protect the battery and manage the battery state of charge (SoC).



Can a battery energy storage system control the microgrid frequency? Battery energy storage systems (BESSs) can play a key role to regulate the frequency and improve the system stability considering the low inertia nature of inverter-based DGs. This paper proposes an optimal control strategy based on fuzzy logic control (FLC) to support the microgrid (MG) frequency.



How can fuzzy modeling improve the dynamic response of a battery? One of the most important parts of fuzzy modeling is determining the membership functions and their types. Hence, determining the shape and type of membership functions using the neural network to improve the dynamic response of the battery can also be used as an attractive topic for future work.



Do battery energy storage systems regulate system frequency? The penetration of renewable energy resources (RERs) in modern power systems has a significant impact on system frequency. Battery energy storage systems (BESSs) can play a key role to regulate the frequency and improve the system stability considering the low inertia nature of inverter-based DGs.



Does the proposed frequency control unit support MG frequency? Based on these input variables and defined fuzzy rules, the proposed frequency control unit has supported the MG frequency. The undershoot of the proposed control is equal to 0.16% and the settling time is equal to 7 s.

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What is a decentralized control strategy based on FLC? In this regard, a decentralized control strategy based on FLC has been applied to BESS in order to improve frequency stability and to have a smooth response in steady-state and transient conditions.



Fuzzy control is an intelligent control method, and its biggest feature is that there is no need to establish a clear relationship between input and output. The coordination control ???



We simulate and compare the frequency modulation control relying solely on the wind farm without energy storage, the fuzzy control coordinated primary frequency control strategy of the ???



energy management. Fuzzy logic controllers are used to enhance energy efficiency, storage, and distribution, hence enhancing grid resilience. Fuzzy logic is shown in the literature to have a ???



Hybrid energy storage capacity configuration optimization In this strategy, part of the power commands are assigned to the energy storage system through fuzzy control, so ???

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Sun et al. (2021) proposed a method of adding fuzzy control to a first-order Kalman filter to feedback and adjust Capacity optimization method of hybrid energy storage system ???



In the configuration of energy storage, energy storage capacity should not be too large, too large capacity will lead to a significant increase in the investment cost. Small energy ???



Against the backdrop of the global energy transition, wind power generation has seen rapid development. However, the intermittent and fluctuating nature of wind power poses a challenge to the stability of grid operation. To ???