

Optimal Placement and Sizing of Energy Storage System in Distribution Network with Photovoltaic Based Distributed Generation Using Improved Firefly Algorithms

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Abstract : The installation of photovoltaic based distributed generation (PVDG) in active distribution system can lead to voltage fluctuation due to the intermittent and unpredictable PVDG output power. This paper presented a method in mitigating the voltage rise by optimally locating and sizing the battery energy storage system (BESS) in PVDG integrated distribution network. The improved firefly algorithm is used to perform optimal placement and sizing. Three objective functions are presented considering the voltage deviation and BESS off-time with state of charge as the constraint. The performance of the proposed method is compared with another optimization method such as the original firefly algorithm and gravitational search algorithm. Simulation results show that the proposed optimum BESS location and size improve the voltage stability.

Keywords : BESS, firefly algorithm, PVDG, voltage fluctuation

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