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Articles

# Power flow control model of energy storage connected to smart grid in unbalanced conditions: a GSA-technique-based assessment

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## ABSTRACT

A gravitational search algorithm (GSA)-based power flow control (PFC) model for energy storage related to smart grid under unbalance conditions is proposed in this paper. Source side and load side power transfer capability is considered to be increased by this proposed algorithm and it offers several conveniences such as the improved predicting capability, degradation in complexity as well as the randomization and so on. The smart grid incorporates the combination of the microgrid (MG) such as renewable energy sources, energy storage devices, grid and

storage of fuel cell (FC) is considered and AC load is utilized. In the proposed method, the controller parameters of the power controller are optimized by the GSA technique based on the variation of active and reactive power of the system. The better power flow under unbalanced load conditions with subject to the minimum power variation is ensured by the optimization process. The proper control signals to the voltage source inverter (VSI) system are generated by this proposed method. Then, the proposed method is implemented using the MATLAB/Simulink platform and a comparison analysis with the existing techniques presents the performance of the proposed method.

**KEYWORDS:**

PFC GSA MG energy storage power controller current controller

## Disclosure statement

No potential conflict of interest was reported by the authors.

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