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Title

Design of smart directional over-current relay to improve the protective performance of the microgrid

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Abstrct

Microgrid plays a very important role in developing and applying distributed generation, especially that based on renewable energies. Provided that a fault occurs in the microgrid, the short circuit current highly depends on the microgrid topology. That is, the mode changing between connection to the main and the island grids, as well as distributed generation resources or lack of them significantly affect the short circuit current. Therefore, using the over-current relay with constant settings disturbs the microgrid protection.

In this research, a new structure is introduced for the digital over-current relay. The intelligent over current relay is a part of the protection structure, which is designed and developed based on the multiagent structure. Using the communication protocol designed in the microgrid, the microgrid components interactively communicate with each other. By the designed structure for the relays and communicating with other microgrid components in the multi-agent environment, the relays identify the microgrid topology, and relatively update their setting. The proposed intelligent and adaptive protection scheme has been applied to a test microgrid by MATLAB/Simulink software, and its performance has been evaluated in the different operation conditions.

Key words: : Micro Grid, Protection system, adaptive rely, Multi-Agent System.