

A Decentralized Technique for Autonomous Service Restoration in Active Radial Distribution Networks

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Abstract

This paper proposes a fully decentralized multi-agent system (MAS) based technique for service restoration of radial distribution networks. The technique utilizes expert system rules and considers the customers' priority and the presence of distributed generators (DGs). It also considers the operational constraints in both healthy and restored sections of the feeder. The technique relies on one type of agents only, hence, simplifying its implementation. Moreover, it allows for assigning a back-up decision making agent to improve the reliability of the restoration process. The effectiveness of the technique is validated through several case studies simulated on an 11 kV distribution feeder. The agents are implemented in Java Agent Developing Framework (JADE) environment for communications and decisions making. Power flow calculations are performed in MATLAB environment to validate the correctness of the agents' decisions.

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