Abstract

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Smart Energy Management System of Environmentally Friendly Microgrid Based on Grasshopper Optimization Technique

A microgrid is a group of distributed energy resources and interconnected loads that may be operated either in isolated mode connected mode with the main utility within electrical boundaries. Microgrids may consist of different types of renewable energy resources such as photovoltaic panels, wind turbines, fuel cells, micro turbines, and storage units. It is highly recommended to manage the dependency on these resources by implementing an energy management unit to optimize the energy exchange so that the minimum cost is achieved. In this paper, an energy management system based on the grasshopper optimization algorithm (GOA) is proposed to determine the optimal power generated by the distributed generators in the microgrid which is required to minimize the total generation cost. The proposed unit is applied to a microgrid that consists of five generating units feeding residential, commercial, and industrial loads, and results are compared to other available research in literature to validate the proposed algorithm.