Abstract

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A Metaheuristic Harris Hawk Optimization Approach for Coordinated Control of Energy Management in Distributed Generation Based Microgrids

Cost management of microgrids represents a real challenge since the power generation of microgrids is usually composed of different renewable and non-renewable sources. Additionally, it is always desired to make a connection between the microgrid and national grid to secure the load demand and to fit the regulations of liberated energy markets. Because of all these reasons, it is essential to develop a smart energy management unit to control different energy resources within the microgrid to achieve minimum operation costs. This paper presents a proposal for a smart unit for the cost management and operation of multi-source based microgrids. The proposed unit utilizes the Harris hawk optimization (HHO) algorithm which is used to optimize the cost of operation based on current load demand, energy prices and generation capacities. The proposed unit is tested on a microgrid with different energy resources using MATLAB while applying different operation scenarios. All simulation results show that the proposed unit succeeds in operating the microgrid at minimum cost. Obtained results are compared with other optimization algorithms and the proposed Harris hawk algorithm gives superior performance.