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Optimized fuzzy-cuckoo controller for active power control of battery energy storage system, photovoltaic, fuel cell and wind turbine in an isolated micro-grid

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This paper presents a new control strategy for isolated micro-grids including wind turbines (WT), fuel cells (FC), photo-voltaic (PV) and battery energy storage systems (BESS). FC have been used in parallel with BESSs in order to increase their lifetime and efficiency. The changes in some parameters such as wind speed, sunlight, and consumption, lead to improper performance of droop. To overcome this challenge, a new intelligent method using a combination of fuzzy controller and cuckoo optimization algorithm (COA) techniques for active power controllers in isolated networks is proposed. In this paper, COA is compared with genetic algorithm (GA) and particles swarm optimization algorithm (PSO). In order to show efficiency of the proposed controller, this optimal controller has been compared with droop, optimized droop, and conventional fuzzy methods, the dynamic analysis of the island is implemented to assess the behavior of isolated generations.

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