

عنوان مقاله:

Optimal Reconfiguration of Solar Photovoltaic Arrays Using a Fast Parallelized Particle Swarm Optimization in Confront of Partial Shading

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خلاصه مقاله:

Partial shading reduces the power output of solar modules, generates several peak points in P-V and I-V curves and shortens the expected life cycle of inverters and solar panels. Electrical array reconfiguration of PV arrays that is based on changing the electrical connections with switching devices, can be used as a practical solution to prevent such problems. Valuable studies have been performed to justify the electrical array reconfiguration efficiency. However, there are some problems such as algorithms complexity, simulations runtime and the inability of objective functions to detect the best array. In this paper, the photovoltaic (PV) array reconfiguration problem is solved by using a parallelized Particle Swarm Optimization (PSO) algorithm, which searches for reducing the rows current difference. The proposed algorithm is implemented in MATLAB/Simulink and is numerically compared with some related works. Results show the simplicity and higher power outputs of the proposed algorithm compared to published papers while ensuring less simulation runtime. Depending on the shading pattern, the power enhancement is different. The .maximum power increase is 26.5 percent of the total array output power

کلمات کلیدی:

Solar energy, electrical array reconfiguration, partial shading, Photovoltaic Arrays

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