Abstract

In this work, we propose a new control law based on the combination between the Particle Swarm Optimization (PSO) method and the classical PI controller to extract the maximum power from a photovoltaic PV panel subject to partial shading. The photovoltaic PV panel has a nonlinear Power-Voltage (P-V) characteristic curve which is used in most controllers to find the Maximum Power Point (MPP). In the general case, a simple control law based on the P&O (Perturb and Observe) method is sufficient, but in cases where a partial shading is introduced or when the PV panel is subject to the soiling effect, the output power is highly affected by such disturbances and classical methods are unable to achieve maximum performance. In this paper a PSO based method is used to find the maximum power point in the case of shaded PV panels and the PI controller adjusts the performance of the system by reaching the reference value in less time and with minimum steady state error. Simulation results show the effectiveness of this method for the extraction of the maximum power available in the presence of different type of disturbances.

References

Conference Record of the Twenty-Eighth IEEE, 1378-1383.

Index Terms
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Keywords
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Partial Shading