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Abstract
The effectiveness of solar energy as a viable energy source is hampered by various factors including high cost of components and lowered operating efficiency due to partial shading. Partial shading reduces the output of not only the shaded part of the panel but also the other panels connected to the same photovoltaic (PV) array. This paper discusses the benefits of using a bypass diode based voltage drop measurement and maximum power point tracking (MPPT) system in the power generation of a PV array. An algorithm to find the global maximum power in short span of time is also presented. MATLAB is then used to perform the simulation of the proposed algorithm on a 3 × 3 photovoltaic array and the results are checked against actual outdoor tests to test the validity of the proposed method. The proposed method holds even when extended to any array combinations for practical applications. © 2018 Elsevier Ltd

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