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FUZZY LOGIC BASED MAXIMUM POWER POINT TRACKING TECHNIQUE FOR PARTIALLY SHADED PHOTOVOLTAIC SYSTEM

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ABSTRACT

Current–voltage and power–voltage characteristics of large photovoltaic (PV) arrays under partially shaded conditions are characterized by multiple steps and peaks. This makes the tracking of the actual maximum power point (MPP) a difficult task. In addition, most of the existing schemes are unable to extract maximum power from the PV array under these conditions. This paper proposes a modified fuzzy-logic controller for maximum power point tracking is proposed to increase photovoltaic system performance during partially shades conditions. Instead of perturbing and observing the PV system MPP, the controller scans and stores the maximum power during the perturbing and observing procedures. The controller offers accurate convergence to the global maximum operating point under different partial shadowing conditions. A mathematical model of the PV system under partial shadowing conditions is derived. To validate the proposed modified fuzzy-logic-based controller, simulation results are provided.

KEYWORDS: Boost Converter, Fuzzy, Logic Controller (FLC), Maximum Power Point (MPP) Tracker (MPPT), Partial Shadowing and Photovoltaic (PV)