

Abstract

Hamdy A. Ashour

Maximum power point tracking for irregular irradiance of a photovoltaic array

This paper investigates different photovoltaic array configurations and their effect on the PV array efficiency, while applying the maximum power point tracking (MPPT) for better utilization of the overall system. There are several MPPT and several arrangements of the PV modules inside the array. Among several studied MPPT algorithms for PV panels, the Perturb and Observe (P&O) method is utilized as the simplest and the easiest to be practically implemented. The PV module has been modeled and the MPPT algorithm has been validated by simulation analysis and experimental implementation using microcontroller and power electronics converter. Different arrangements of the PV array were discussed, and a comparison study between the central inverter configuration and the multi-string configuration is conducted. Results obtained showed that the MPPT within multi-string configuration improves the overall utilization of the PV array more than the central inverter configuration.