

Abstract

The paper carries out an experimental investigation of a new Maximum Power Point Tracking (MPPT) method for standalone Photovoltaic (PV) systems. The new method combines a novel mechanism of global maximum power point identifying loop when the system undergoes multiple maximum power points and the use of adaptive variable step Hill Climbing (HC) MPPT technique to track the identified Global Maximum Power Point (GMPP). To figure out the advantages of the proposed method, it is implemented together with three local MPPTs (e.g., two conventional MPPTs and fuzzy logic-based one) and compared with six recently developed Global MPPT methods. Obtained experimental results as well as comparison outcomes show that the proposed MPPT technique is fast while tracking GMPP (around 2.4 s) and resilient against perturbations that may occur during the operation of the PV system. Moreover, the proposed MPPT method boasts other advantages such as ease of implementation, no dependence on the PV system and requires only two conventional sensors of voltage and current respectively.