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MPPT TECHNIQUES FOR PHOTOVOLTAIC APPLICATIONS

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ABSTRACT

The photovoltaic (PV) system is one of the renewable energies that attract the attention of researchers in the recent decades. The PV generators exhibit nonlinear I–V and P–V characteristics. The maximum power produced varies with both irradiance and temperature. Since the conversion efficiency of PV arrays is very low, it requires maximum power point tracking (MPPT) control techniques. The maximum power point tracking (MPPT) is the automatic control algorithm to adjust the power interfaces and achieve the greatest possible power harvest, during moment to moment variations of light level, shading, temperature, and photovoltaic module characteristics. The purpose of the MPPT is to adjust the solar operating voltage close to the MPP under changing atmospheric conditions. It has become an essential component to evaluate the design performance of PV power systems. This investigation aims to assess different MPPT techniques, provide background knowledge, implementation topology, grid interconnection of PV and solar microinverter requirements presented in the literature, doing depth comparisons between them with a brief discussion. The MPPT merits, demerits and classification, which can be used as a reference for future research related to optimizing the solar powe generation, are also discussed. Conventional methods are easy to implement but they suffer from oscillations at MPP and tracking speed is less due to fixed perturb step. Intelligentmethods are efficient; oscillations are lesser at MPP in steady state and tracked quickly in comparison to conventional methods