

Abstract

Mohamed Atef El-Saharty

A Novel DC-Bus Sensor-less MPPT Technique for Single-Stage PV Grid-Connected Inverters

Single-stage grid connected inverters are considered as an economic, compact and simple topology compared with multi-stage inverters. In photovoltaic (PV) grid connected systems, the major requirement is to achieve maximum output power from the source. Maximum Power Point Tracking (MPPT) techniques require measurements on the DC side of the inverter connected to the PV in order to determine the current operating point on the power characteristics. Typically this is achieved by perturbing the reference output power and observe the change in the PV voltage, current both. Based on the observation, it could be determined whether the current operating point is beyond below maximum power. This paper presents an MPPT technique for a single-stage PV grid connected inverter where the MPPT algorithm determines the current operating point at different operating conditions based upon observing the inverter controller action. Such approach eliminates the requirement of sensing elements to be added to the converter which aids the advantages of the single-stage converter. Design of the utilized PV system is derived based on filter parameters, PV panel Selection and controller parameters. Using simulation and practical implementation, the performance of the proposed MPPT technique is evaluated for the PV grid connected system.