PV interfacing system based on dual cascaded inverter

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Abstract

This paper presents an interfacing system of a photovoltaic (PV) array with an electrical grid based on a dual cascaded inverter. The PV array is connected to the main inverter through a boost converter, for maximum power extraction, while the dc-side of the auxiliary inverter is connected to a capacitor bank. The main and auxiliary inverters are controlled to deliver the harvested maximum power from the PV array to the grid and simultaneously regulating the dc-side voltage of the auxiliary inverter at a constant ratio from the dc-link voltage of the main inverter. Four Hysteresis controllers are proposed for the three-phase currents fed to the grid and the dc-side capacitor voltage of the auxiliary inverter. Two switching control methods are adopted for the dual cascaded inverter: the conventional Hysteresis Current Control (HCC) and the Space Vector Modulation (SVM) based HCC. The later technique offers reduced switching numbers for both inverters compared with the conventional HCC. Simulation results show fast dynamic response and accurate performance of the proposed controllers.

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