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ABSTRACT

Integrating photovoltaic based electricity into the grid and power quality improvement have become two major issues in electrical system. Formerly, these can be solved by using two converter systems separately, a PV-Grid System and an active power filter. But recent technology uses only a converter system to do both function. An existed shunt active power filter (SAPF) can be modified to form a dual-stage PV-Grid with active filtering capability. In this paper, a PV-Grid System that is capable to transfer all power generated by PV modules and reduce harmonic contents is proposed. The system was formed by connecting a boost chopper as a Maximum Power Point Tracker and PV modules to the DC-link capacitor of a single-phase SAPF. It just needed a current transducer and also required simpler control circuits. A voltage controller was needed to achieve power equilibrium while a current controller was needed to make the grid current sinusoidal with unity power factor. To verify the analysis, simulations and experiments were done.