

Z-Source Inverter for PV System with LVRT Capability

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Abstract: *This paper presents a Photovoltaic (PV) application with Power Electronics Interface (PEI). As the penetration of distributed generation systems is booming, the PEI for renewable energy sources should be capable of providing ancillary services such as reactive power compensation and low-voltage ride through (LVRT). This dissertation proposes a robust model predictive-based control strategy for grid-tied Z-source inverters (ZSIs) for PV applications with LVRT capability. The proposed system has two operation modes: normal grid condition and grid fault condition modes. In normal grid condition mode, the maximum available power from the PV panels is injected into the grid. In this mode, the system can provide reactive power compensation as a power conditioning unit for ancillary services from DG systems to main AC grid. In case of Grid faults, the proposed model changes the behavior of reactive power injection into the grid for LVRT operation according to the Grid requirements. Thus, the proposed controller for Z-Source Inverter is taking into accounts both the power quality issues and reactive power injection under abnormal grid conditions. In this system operation is verified experimentally, the results demonstrate fast dynamic response, small tracking error in steady-state, and simple control scheme..*

Keywords: Photovoltaic System, LVRT logic, LVRT, MPPT, ZSI.

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