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Strategy to enhance the low-voltage ride-through in photovoltaic system during multi-mode transition

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ABSTRACT

With the increasing capacity of distributed generation (DG) connected to the power grid, the future generation of photovoltaic (PV) systems are expected to provide a full range of voltage regulation during grid faults in order to enhance the low-voltage ride-through (LVRT) capability of a PV system. In such a condition, the DG should remain connected to the grid for reactive power support, thereby improving voltage profile. This paper aims to propose a control strategy of active and reactive power for a single-stage three-phase grid-connected PV system to enhance the LVRT. The dynamic behaviours of the system were investigated by considering various scenarios such as varying irradiance, local load disconnection, and short circuits, at different locations during the multi-DG operation. Results confirm that the grid-connected PV system is able to remain connected to the power grid during steady-state and transient-state conditions without violating the grid code requirements. The established dynamic behaviour analysis model of the proposed control for grid-connected PV systems can be used in planning an operational strategy for a practical system.