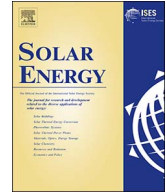


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Low voltage ride-through capability control for single-stage inverter-based grid-connected photovoltaic power plant



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ABSTRACT

The low voltage ride-through (LVRT) capability is one of the challenges faced by the integration of large-scale photovoltaic (PV) power stations into electrical grid which has not been fully investigated. Therefore, this paper presents a comprehensive control strategy of single-stage PV power plant to enhance the LVRT capability based on the Malaysian standards and modern grid codes connection requirements. The proposed control overcomes the problems of dc-link over-voltage and ac over-current that may cause disconnection or damage to the inverter. For this purpose, dc-chopper brake controller and current limiter are used to absorb the excessive dc-voltage and limits excessive ac current, respectively. This control strategy can also ensure the reactive power support through the injection of reactive current according to the standard requirements as soon as the voltage sag is detected. Furthermore, to keep the power balance between both sides of the inverter, PV array can generate possible amount of active power according to the rating of grid inverter and voltage sag depth by the operating in different modes. The results illustrate that the proposed control strategy is effective, not only to improve the capability of ride-through fault safely and keep the inverter connected, but also to provide grid support through active and reactive power control at different type of faults.