

Transformer Less Inverter with Virtual DC Bus Concept for Cost-Effective Grid –Connected PV Power System

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Abstract: *In order to eliminate the common-mode (CM) leakage current in the transformer less photovoltaic (PV) systems, the concept of the virtual dc bus is proposed in this paper. By connecting the grid neutral line directly to the negative pole of the dc bus, the stray capacitance between the PV panels and the ground is bypassed. As a result, the CM ground leakage current can be suppressed completely. Meanwhile, the virtual dc bus is created to provide the negative voltage level for the negative ac grid current generation. Consequently, the required dc bus voltage is still the same as that of the full-bridge inverter. Based on this concept, a novel transformer less inverter topology is derived, in which the virtual dc bus is realized with the switched capacitor technology. It consists of only five power switches, two capacitors, and a single filter inductor. Therefore, the power electronics cost can be curtailed. This advanced topology can be modulated with the unipolar sinusoidal pulse width modulation (SPWM) and the double frequency SPWM to reduce the output current ripple. As a result, a smaller filter inductor can be used to reduce the size and magnetic losses.*

Keywords: MPPT, Common mode noise, Photovoltaic (PV)

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