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A NEW SUGGESTION OF REAL NETWORK-CONNECTED CONVERTER FOR COMMON MODE CURRENT DIMINUTION IN PHOTOVOLTAIC (PV) TRANSFORMERLESS SYSTEMS

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ABSTRACT

The conventional network-connected photovoltaic inverter includes either a line frequency or a high frequency transformer between the inverter and grid. Many transformerless topologies for photovoltaic (PV) systems were planned in order to diminish power losses and avoid high levels of common-mode current. In household network connected PV applications a single phase converter is typically used. The abolition of the output transformer from network-connected PV systems not only reduces the cost, mass, and weight of the conversion stage but also increases the system overall efficiency. The model of a photovoltaic (PV) network-connected converter usually comprehends a galvanic isolation between the network and the PV panels. Recently, in low power systems, the galvanic segregation has been separated with the aim to increase efficiency and reduce the cost of the converter. Due to the of a stray capacitance between the PV panel, usually connected to earth, a high value of common mode current (i.e., ground leakage current) can arise. While protection requirements in transformer less systems can be met by means of outside elements, common-mode current and the vaccination of direct current (dc) into the network must be assured topologically or by the inverter's control system. In order to bind the common mode current, new converter topologies have been planned. Amplitude and spectrum of the soil current depends upon the converter topology, the switching strategy, and the resonant circuit formed by the soil capacitance (stray capacitance), the converter, the ac filter, and the network. Experimental and matlab simulation result confirm the effectiveness of the planned solution.

KEYWORDS: Common-Mode Current, Junction Capacitance, PV Systems, Sinusoidal Pulse Width Modulation (SPWM) Strategy, Transformerless Inverter