Optimized Control of a Five-Level Transformerless Inverter Using Bayesian Techniques

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Abstract

Common-ground (CG) based transformerless multilevel inverters (MLIs) are well-suited for grid-connected photovoltaic (PV) applications, because of their ability to eliminate leakage current and high efficiency. In this paper a reduced-switch CG five-level transformerless inverter (CG-5L-TLI) is presented that uses a dc source, one diode, seven switches and two capacitors. The proposed topology inherently eliminates leakage current, offers boosting of voltage without the need for any extra boost converter, and also ensures voltage balancing of the capacitors without requiring auxiliary control circuits. To improve the quality of output waveform, a selective harmonic elimination (SHE) strategy is employed, with optimal switching angles determined using a Bayesian optimization approach for the multilevel SHE-PWM scheme. The performance and effectiveness of

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