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A Novel Single-Stage Buck-Boost Transformer-less Inverter for 1-phase Grid-Connected Solar PV Systems

In this project, a novel single-stage Buck-Boost Transformer Less Inverter (BBTI) topology is proposed for single-phase grid-connected solar PV applications. In this topology, the input PV source shares the common ground with neutral of the grid which eliminates the leakage currents. Further, the proposed topology has the buck-boost ability which tracks the maximum power point even under the wide variation of input PV voltage. Another feature of the proposed topology is that it uses only one energy storage inductor which provides symmetric operation during both half cycles of the grid. In addition, the two out of five switches of the proposed topology operate at a line frequency, thereby, it exhibits low switching losses and the other three switches conduct in any mode of operation which incurs low conduction losses. A simple sine-triangle pulse width modulation strategy is proposed to control the proposed inverter topology is analyzed at all operating modes and explained in detail. Simulations are carried out on the 300W simulation model and all the major results are included in the project, which shows that the proposed system gives higher efficiency with lower THD in output current.

Domain: Power Systems solar Power Generation

Technology: Electrical