

COMPARATIVE ANALYSIS OF A THREE PHASE FIVE LEVEL DIODE CLAMPED INVERTER WITH THREE LEVEL BOOST CIRCUIT USING DIFFERENT MODULATION STRATEGIES

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ABSTRACT

Nowadays multi level inverters are extensively used to convert a small value of dc voltage to a suitable amount of ac voltage. Basically there are three configurations of the multilevel inverters, diode clamped, capacitor clamped and cascade H Bridge. Among all these configurations Diode clamped inverter topologies are used as Static VAR compensators, high voltage grid interconnections, and variable speed motor drives. In this paper a passive front end capacitor voltage balancing method is used for a five level diode clamped inverter with high modulation index. Here the active front end solution is used to balance the dc link capacitor voltage of the five level diode clamped inverter. Capacitor voltage balancing is performed by a three level boost converter connected to the inner two capacitors and an additional balancing circuit is used to balance the other two capacitors. Finally the five level diode clamped inverter is tested using different modulation techniques and the results obtained from the MATLAB/ SIMULINK is tabulated to compare the Total Harmonic Distortion (THD), output RMS voltage (V_0 RMS), Crest Factor (CF), and Form Factor (FF) for different modulation techniques along with different modulation indices.

KEYWORDS: Five level Diode Clamped Inverter, Capacitor Voltage balancing, Three level boost converter, Modulation Index, Total Harmonic Distortion (THD).

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