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Design and Analysis of 11-level Cascaded H-Bridge Multilevel Inverter using Various SPWM Controlling Techniques Considering Current and Voltage Harmonic

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Abstract—This paper implements an 11-level Cascaded H-Bridge multilevel inverter using Simulink /MATLAB. The output voltage and current of the inverter are analyzed in detail by considering IPD-SPWM, APOD-SPWM, and POD-SPWM. The effect of modulation index, RL load variations, and passive low pass filter has also been demonstrated. Simulation results suggest that a higher value of modulation index undergoes less Total Harmonic Distortion (THD) and harmonics in the current waveform are highly reduced to 4.42% if RL load is used which qualifies for IEEE standard-519, However, harmonics in voltage can be mitigated using low pass filter. In the end, we propose POD-SPWM be the best candidate among the three SPWM techniques.

Keywords— Multilevel, THD, APOD, POD, SPWM, IPD