

Analysis of Total Harmonic Distortion and its Elimination by Multilevel Inverter

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Abstract—

As the conventional sources of energy are exhausting rapidly, the demand of renewable sources are increasing day by day. The major problems associated with these sources are voltage imbalance, harmonic content and switching losses due to the power electronics converter connected to these sources. The waveform of practical inverters are non-sinusoidal and contains certain harmonics, but for many applications such as high power application, various industries which involves use of machines and fans, sinusoidal supply with low distortion are required. This paper is aimed at investigating and analyzing effect of total harmonic distortion and its elimination using multilevel inverter. Simulation study of the output voltage waveform of 2-level, 3-level and 5-level three-phase diode clamped converters using sinusoidal pulse width modulation technique has been done and total harmonic distortion (THD) of all the levels are compared. The results obtained by varying the switching frequency of inverter is also compared. The record shows that as the number of level increases, total harmonic distortion decreases and quality of output voltage improves.

Index Terms/Keywords—

Multi-level Converters, H-bridge Multi-level Converter, Pulse Width Modulation, Two Level Converter, Three Level Converter, Five Level Converter, MATLAB, Total harmonic Distortion, Inverter.