

## Hybrid PWM Techniques for the Reduction of Switching Losses and Voltage Harmonics in Cascaded Multilevel Inverters

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**Abstract :** These days, the industrial trend is moving away from heavy and bulky passive components to power converter systems that use more and more semiconductor elements. Also, it is difficult to connect the traditional converters to the high and medium voltage. For these reasons, a new family of multilevel inverters has appeared as a solution for working with higher voltage levels. Different modulation topologies like Sinusoidal Pulse Width Modulation (SPWM), Selective Harmonic Elimination Pulse Width Modulation (SHE-PWM) are available for multilevel inverters. In this work, different hybrid modulation techniques which are combination of fundamental frequency modulation and multilevel sinusoidal-modulation are compared. The main characteristic of these modulations are reduction of switching losses with good harmonic performance and balanced power loss dissipation among the device. The proposed hybrid modulation schemes are developed and simulated in Matlab/Simulink for cascaded H-bridge inverter. The results validate the applicability of the proposed schemes for cascaded multilevel inverter.

**Keywords :** hybrid PWM techniques, cascaded multilevel inverters, switching loss minimization

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