Modelling and Simulation of Cascaded H-Bridge Multilevel Single Source Inverter Using PSIM

Authors : Gaddafi Sani Shehu, Tankut Yalcınoz, Abdullahi Bala Kunya

Abstract : Multilevel inverters such as flying capacitor, diode-clamped, and cascaded H-bridge inverters are very popular particularly in medium and high power applications. This paper focuses on a cascaded H-bridge module using a single direct current (DC) source in order to generate an 11-level output voltage. The noble approach reduces the number of switches and gate drivers, in comparison with a conventional method. The anticipated topology produces more accurate result with an isolation transformer at high switching frequency. Different modulation techniques can be used for the multilevel inverter, but this work features modulation techniques known as selective harmonic elimination (SHE).This modulation approach reduces the number of carriers with reduction in Switching Losses, Total Harmonic Distortion (THD), and thereby increasing Power Quality (PQ). Based on the simulation result obtained, it appears SHE has the ability to eliminate selected harmonics by chopping off the fundamental output component. The performance evaluation of the proposed cascaded multilevel inverter is performed using PSIM simulation package and THD of 0.94% is obtained.

Keywords : cascaded H-bridge multilevel inverter, power quality, selective harmonic elimination
Conference Title : ICEMPE 2014 : International Conference on Electrical Machines and Power Electronics
Conference Location : Istanbul, Türkiye
Conference Dates : May 22-23, 2014

Open Science Index, Electrical and Information Engineering Vol:8, No:05, 2014 publications.waset.org/abstracts/9115.pdf