

Analysis of switches blocking voltages in a voltage taps based cascaded multilevel inverter topology

ABSTRACT

Cascaded multilevel inverters are widely used in various fields, from oil and gas, power supply installations, to power quality devices. Various topologies have been presented in literatures regarding the cascaded multilevel inverter. In order to reduce the number of switches, there are several topologies presented based on series dc sources with voltage taps in between. However there are several challenges when constructing a working inverter circuit based on this topology, particularly the switches need to be working similar to an ideal switch to prevent short-circuit condition of the dc sources. This mean a bidirectional configuration need to be adapted for some or all of the switches. In this paper a new improved cascaded multilevel inverter topology with a minimum number of switching devices is discussed. Matlab simulation is used to determine the voltage and current vector quadrants of the switches. The results of the analysis then used to determine whether the switches need to be bidirectional or only unidirectional.

Keyword: Multilevel inverter; Minimum switches; Conducting switches; Power converter