

A cascaded multilevel inverter topology with only one bidirectional conducting switch

ABSTRACT

The most common multilevel inverter topology types are neutral point clamped or diode clamped inverter, flying capacitor inverter and cascaded H-bridge inverter. Among the three, the cascaded H-bridge inverter is becoming the most popular type of multilevel inverter as the world is moving towards renewable energy. The cascaded H-bridge has modular structure, so it can be easily adapted in multiple dc sources system such as photovoltaic systems. The main disadvantage of cascaded H-bridge inverter is it requires a high number of switches, particularly for a high number of output voltage levels design. Another major disadvantage is a high number of switches need to be turned on during cascaded H-bridge operation, thus accumulating voltage drops across the conducting switches before it reach the output terminals, resulting losses and reduced efficiency, especially for a high power installation. In this paper, an uninterrupted neutral line multilevel inverter topology with only one conducting bidirectional switch at any time of operation is proposed. A 41-level version of the proposed topology is constructed and tested in Matlab Simulink platform. The result shows that for a high output voltage levels and high power load, the proposed inverter has a very low output THD level and a minimum internal losses.

Keyword: Cascaded multilevel inverter; Conducting switch; High power inverter; Uninterruptible neutral line; Renewable energy; Low THD component