An attempt to Design and Analysis of Multilevel Converter Topology for Renewable Energy Applications

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Document Sections

- I. Introduction
- II. Design of Improved
 Converter Toplogy
- III. Simulation & Results
- IV. Conclusions

Authors

Figures

References

Keywords

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Abstract:

Multi-level inverter system architecture and simulation has great potential to integrate and expand the solar photovoltaic system. The multi-stage inverter design is based on a number of topologies. The improved space vector pulse width modulation makes it possible both in qualitative and quantitative terms to improve systems efficiency and production. The device can be connected to the photovoltaic solar system. Generated DC power is link to the AC grid through the inverter and power transformers. Harmonic filters and massive, expensive, and lossy transformers are used in traditional inverters. Multi-level inverters with lower Total Harmonic Distortion (THD), inductor-free design and increased control range are a viable alternative to conventional inverters. They create a steps-like waveform that looks a lot like a sine wave. Smart grids can include a lot of distributed sources, and if those sources have low THD, filtering them at the common point of connection isn't as difficult. This paper proposes 19-level inverter with high boosting power and minimal THD. Phase Opposition Disposition Pulse Width Modulation (PODPWM) technique modulates the inverter switches for voltage balance and switching losses minimization. Simscape Power Systems' MATLAB Simulink toolkit used for simulation.

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I. Introduction

Photovoltaics are a cluster of photovoltaic solar material cells that modifies the flow of power over solar radiation. Photovoltaics have been growing at intervals, growing every year since 2002 by an average of 48 percent, making it the fastest-developing breakthrough in vitality in the world. Solar vitality is also addressed in relation to the other developments in renewable energy sources, which have, in addition, distributed vitality ages. Photovoltaic frameworks are a system that uses solar cells to shift their energy by solar vitality. Owing to the low voltage of a person's solar cell (regularly 0.5V), multiple photovoltaic modules consolidate a few cells, which are converted into an exhibit together. The generating power can be either withdrawn, used directly (independent power plant) or used to form an enormous network operated by focal age plants (lattice-related/ matrix- related power plant) or joined to one or more home-made power generators (half and half) [1].

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