

# **SINGLE PHASE CASCADED MULTILEVEL INVERTER**

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## **ABSTRACT**

The emergence of multilevel converter has become attractive in the power industries and it is suitable in many applications due to their ability to synthesize waveforms with better harmonic spectrum. This paper presents the single phase cascaded multilevel inverter with 11 levels output. This project's objectives are to build the single phase cascaded multilevel inverter model and to get the steps output waveform which the voltage will boost according to the number of level and lastly to investigate its performance in term of harmonics. Software simulation which is used in this project is by using MATLAB/SIMULINK. The switching method that used to control IGBT switches is by using SPWM method. The simulation results are reported and discussed.



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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction**

The multilevel inverters have drawn tremendous interest in the power industry. It may be easier to produce a high power, high voltage inverter with the multilevel structure because of the way in which device voltage stresses are controlled in the structure. The unique structure of multilevel voltage source inverter allows them to reach high voltages with low harmonics without the use of transformers [1]. As the number of levels increases, the synthesized output waveform adds more steps producing a staircase wave which approaches the sinusoidal wave with minimum harmonic distortion. Ultimately, a zero harmonic distortion of the output wave can be obtained by an infinite number of levels [2]. The multilevel inverters can be classified into three types [6].

- Diode-clamped multilevel inverter.
- Flying-capacitors multilevel inverter.
- Cascaded multilevel inverter.

Among those types of multilevel inverter, the flying capacitor inverter is difficult to be realized because each capacitor must be charged with different voltages as the voltage level increases. Moreover, the diode-clamped also difficult to be expanded to multilevel because of the neutral problem of DC link voltage unbalancing. The type of multilevel inverter that has been done in this project is cascaded multilevel inverter.