

# 基于 MATLAB 的 SPWM 的谐波分析及抑制方法研究与仿 真

## 摘 要

SPWM 逆变器技术在我们的实际中已经逐渐得到了非常广泛的研究和应用, 随着我国现代经济社会的高速进步和发展, 对于电力电子技术的市场需求也在逐步的增大, 其中, 如何解决使各种 PWM 逆变器所调制脉冲产生的谐波频率减小的相关问题已经成为了热点研究趋势, 因此本文主要通过对单极性方式下的单相 SPWM 逆变器和双极性方式下的单行 SPWM 逆变器输出的电压谐波进行了分析与对比, 找出一些载波抑制脉冲谐波的基本规律, 最后在对单极性 SPWM 逆变器输出电压波形中的谐波进行分析和研究, 讨论出一种有效抑制高次谐波的方式。

本文基于 SPWM 逆向变压器输出电压的结构理论和模型, 简要地分析单相 SPWM 逆向变压器输出电压谐波的基本特征。通过 matlab/simulink 对两种不同载波控制方式下的单相 SPWM 逆变器仿真, 分析输出电压谐波的特点。研究表明, 单相 SPWM 逆向电源变压器的输出电压的波形和其中谐波的含量与不同的载波极性方式、载波比, 调制深度等有关。因此, 想要以不同的程度去有效抑制逆变器输出电压的谐波, 可以选择合适的调制深度和合适的载波比, 但是两种载波控制方法都具有一定的技术局限性。

**关键词:** SPWM 逆变器; matlab/simulink; 谐波分析对; 谐波抑制方法

## Abstract

SPWM invert technology has gradually been widely studied and applied in our practice. With the rapid progress and development of our modern. Among them, how to solve the problem of reducing the harmonic frequency generated by various PWM interstices has become a hot research trend, The invert using SPWM buffer technology, that is, SPWM invert technology, has completely changed the idea and mode of its modulation pulse in the technology of modulation pulse frequency and sinusoidal width, so this paper mainly analyzes the output voltage and harmonic frequency of SPWM invert under two different carrier modulation modes By contrast, some basic rules of carrier wave restraining pulse harmonic are found out. Finally, the harmonics in the output voltage waveform of uni polar SPWM invert are analyzed and studied, and an effective way to suppress higher harmonics is discussed.

Firstly, according to the structure theory and model of single-phase SPWM reverse transformer output voltage, the basic characteristics of single-phase SPWM reverse transformer output voltage harmonic are analyzed. This paper mainly studies the structure and characteristics of harmonic in the output voltage of single-phase SPWM invert under two different carrier control modes. Secondly, it is necessary to further study the technology and method to effectively suppress the harmonic in the output voltage of single-phase SPWM invert.

Therefore, it is possible to effectively suppress the harmonics of the invert output voltage to different degrees and to select the appropriate modulation depth and the appropriate carrier ratio, but both carrier control methods have certain technical limitations.

**Key words:** SPWM invert Mat-lab / Simulink harmonic analysis and comparison of harmonic suppression methods

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