THREE PHASE SPACE VECTOR MODULATION VOLTAGE SOURCE INVERTER USING PV SOLAR

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ABSTRACT

One of the best choice techniques of modulation to drive 3 phase load is space vector modulation (SVM). Since then, the study on three phase space vector modulation voltage source inverter has been implemented. This project is to design the three phase voltage source inverter space vector modulation. Futhermore, this study need to compare and analyze the waveforms of hardware when using PV solar as supply and original dc supply. The output results which are the waveforms of line to line voltages, pole voltages and phase voltages have been compared. In addition the Total Harmonic Distortion (THD) will be evaluated between using dc supply and PV solar. C language is using in MPLAB to programmed the space vector modulation (SVM). The waveforms have been developed with PIC 18F455 using MPLAB.

Keywords: Three Phase, Space Vector Modulation, Voltage Source Inverter, Total Harmonic Distortion, PV Solar.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Variable frequency ac drives are increasingly replacing dc drives in a number of industrial applications due to advantages in size, reliability and efficiency [12]. Ac drive is one of the main components power electronic converters in the form of voltage source inverter that takes dc voltage input and produces a sinusoidal ac waveform.

Space vector modulation (SVM) is an algorithm to control the pulse width modulation (PWM) for three phase inverter [1]. Space vector modulation (SVM) can generate sine wave while pulse width modulation (PWM) only generates square wave modulation. Moreover, the advantages of SVM are provide a high voltage to the motor with lower harmonic distortion, widely used for digital control of voltage source inverters and one of the preferred real time modulation techniques. Voltage source inverter (VSI) is used to transfer real power from a DC power source to an AC load [1].

Three phase have several advantages over single phase such as more efficient, has smother running and use less parts so is more reliable. Three phase drives are very suitable for induction motor, ventilation fan, air conditioning and high power application.