COMPARISON STUDY BETWEEN PULSE WIDTH MODULATION AND SPACE VECTOR MODULATION APPLIED TO THREE PHASE VOLTAGE SOURCE INVERTER

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ABSTRACT

This paper describes the operation of three phase voltage source inverter (VSI) and how it operates. Since VSI can be applied in several method, thus the results will show comparison between pulse width modulation (PWM) and space vector modulation (SVM) method applied to three-phase VSI. The hardware implementation, simulation and programming had been applied in this project with MATLAB software for simulation result and MPLAB software used for programming of PIC 16F78A. The results obtained from hardware were compared with simulation results. There are two circuits used to run the hardware which are controller circuit and voltage source inverter circuit. SVM and PWM are used to control switching of MOSFET according to firing sequence applied. The comparison will show the better method apply for voltage inverter by considering total harmonic distortion (THD) which is SVM since it produce low THD.

Keywords-component; Space vector modulation (SVM); three phase; voltage source inverter (VSI); total harmonic distortion (THD)

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CHAPTER 1

INRODUCTION

1.1 BACKGROUND OF STUDY

In view of restricted number of machine phases, variable speed AC drives need a power electronic converter and this contributed towards the expansion in the various types of applications for AC drives. [1]. Pulse Width Modulation is an algorithm that generates a switching function, commonly known as a technique to convey partial power to the load through digital means. It is widely used in video devices, RC devices, audio devices, power delivery between the popular and telecommunications as effective at data transmission over long distance transmission lines, including application to the DC Motors as ability to control the speed of the motor via the duty cycle.

In order to obtaining less THD in switching waveform, less switching losses and achieving wide linear modulation range, wide variety of PWM methods have been developed [2]. Year after year passed and a lot of development has been conducted to improve and renew the signal modulation technique and one of them is the SVM technique that used to control PWM. Since microprocessor have development year by year, SVM become one of the important PWM methods for three phase inverter. Compared with PWM, SVM technique introduced in an effort to provide better performance and harmony reduce losses. The most flattering development of this