

**TWO-LEVEL FIVE-PHASE VOLTAGE SOURCE INVERTER
USING MEDIUM AND LARGE VECTOR SWITCHING
TECHNIQUE WITH DSP IMPLEMENTATION**

This thesis is presented in partial fulfillment for the award of the

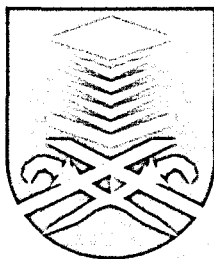
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ABSTRACT

In high power application, multiphase drives provide several advantages compared to conventional three phase drives, but implementation of multiphase drives produce unwanted harmonic content that lead to distorted sinusoidal waveform and increase of losses. Elimination of harmonic content can be performed by implementation of switching technique. This research paper propose the design and analysis of experimental study on two-level five-phase voltage source inverter using space vector modulation technique perform by Digital Signal Processor (DSP) as an inverter switching control. Otherwise, the implementation of large vector only switching technique still generate high amount of low order harmonic. The simulation and hardware design was carried out to identify the capability of medium and large vector combination technique in reducing low order harmonic which is high in large vector only technique and produce output voltage waveform close to sinusoidal. By using large and medium vector, low order harmonic especially 3rd and 7th order was reduce rapidly and produce less distortion output voltage.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Nowadays, power electronic converter was required by variable speed drives for an AC machine as their supply. This requirement had increase attention in multiphase instead of standard three phase configuration to develop the performance of AC machine. Moreover, the introduction of multiphase motor provides several advantages compared to convenient three phase motor, especially in the field of high-power application[12], in terms of system overall performances, increase in reliability, reducing current per phase without increasing the voltage per phase, improvement of noise characteristic and reducing stator copper loss[7].

Multiphase variable speed drives supply was generally provide by voltage source inverter (VSI). Multiphase drives is unavoidable in the generation of low order voltage harmonic in VSI output that lead to distorted sinusoidal waveform and increase losses, especially in machine stator [3]. Space vector pulse width modulation (SVPWM) technique was found to be the most efficient technique for five phase VSI in order reduce the total harmonic distortion (THD) [3] .

SVM technique for large vector only is focus on the outermost decagon of space vector from d-q plane. Otherwise, the output voltage from this technique contains a large amount of low order harmonic especially 3rd order harmonic. SVM technique with combination of medium and larger vector was introduced to overcome all limitation of