

# **SPEED CONTROL OF DC MOTOR BY USING PULSE WIDTH MODULATION**

Thesis is presented in partial fulfillment for the award of the bachelor of Engineering  
(Hons) in Electrical

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## **ABSTRACT**

This paper presents a method of speed control of dc motor by constructing a full wave rectifier circuit controlled by Pulse Width Modulation (PWM) switching technique. The Insulated Gate Bipolar Transistor (IGBTs) is used as the main switching devices and the Xilinx, Field Programmable Gate Arrays (FPGAs) is used to control signal for required Pulse Width Modulation (PWM) switching pattern. The straight PWM switching technique is used to control the output voltage by changing the modulation index (ma). Thus, the speed of dc motor can be controlled by the modulation index.

# TABLE OF CONTENTS

<b>CHAPTER</b>		<b>PAGE</b>
	Declaration	1
	Acknowledgement	11
	Abstract	111
	Table of Contents	1V-VI
	List of Figures	VII-VIII
	List of Tables	IX
	Abbreviations	X
<b>1</b>	<b>INTRODUCTION</b>	
	1.1 Introduction	1
	1.2 Main task of power electronics	2
	1.3 Demands for power electronics	3
	1.4 Scope of work	4
	1.5 Organization of the Thesis	4
<b>2</b>	<b>PULSE WIDTH MODULATION</b>	
	2.1 Introduction	6
	2.2 The PWM switching pattern	6
	2.2.1 The sinusoidal PWM switching pattern.	6
	2.2.2 The straight line PWM switching pattern	7
<b>3</b>	<b>RECTIFIER CIRCUIT</b>	
	3.1 Introduction	10-11
<b>4</b>	<b>XILINX FPGA DESIGN FOR DC MOTOR SPEED CONTROL</b>	
	4.1 Design flow overview	12
	4.2 DC motor speed control strategy	13
	4.3 Xilinx foundation series	13

# CHAPTER1

## INTRODUCTION

### 1.1 Introduction

Nowadays, DC machines are versatile machines and extensively used in industry. The DC machine is extensively used as a motor in industry because of its speed can be controlled over a wide range with relative ease. Besides that, the methods of control are simpler and less expensive than those applicable to AC motors. The technology of speed control of DC motors has evolved since 1890s and being introduced by Ward Leonard for rotating machine speed application. Recently, solid-state converters have been used for speed control of DC motors. [1]

The Pulse Width Modulation (PWM) is a common technique in power electronics converter. The technique of modulating the duration of the ON and OFF pulse that are applied to the switching IGBTs is called PWM. PWM function is to varying the duty cycle. If the width of duty cycle is increased, the speed of DC motor will increase accordingly. [2]

The project is to investigate the performance of AC to DC converter circuit controlled by PWM switching technique. The PsPICE simulation software is used to simulate the converter circuit topology with various type of PWM switching pattern and to monitor the third harmonics contents in rectifying circuit that using PWM switching technique.