

DC-DC BOOST CONVERTER USING FUZZY LOGIC CONTROLLER

**This thesis presented in partial fulfillment for the award of the
Bachelor in Electrical (Hons)**

UNIVERSITI TEKNOLOGI MARA



**AZROL HISYAM BIN LOMAN
2005610415
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 Shah Alam, Selangor
MAY 2009**

ABSTRACT

This dissertation presents the simulation design dc-dc boost converter using fuzzy logic controller. All the simulation was been held in MATLAB-SIMULINK. The evaluation has been carried out and was been compared between open loop system and closed loop system to demonstrate the fuzzy logic controller can improve the performance of boost converter by reducing the percentage of overshoot, and producing the output voltage with the same amount as required.

Design and calculation the components' especially for the inductor has been done to ensure the converter operate in continuous conduction mode. Beside that, the precious calculation of the parameters will guide to the maximum performance of the system.

ACKNOWLEDGEMENTS

All praise to the Almighty Allah, for giving me strength, patience and guidance throughout the process of completing this research study.

I would like to express my sincere appreciation to my supervisor Mr. Nik Fasdi B Nik Ismail, for his support, belief, patience, fairness, and for his feedback. I have to thank him for many opportunities and knowledge he has given me over the year.

Also to my beloved parents, I would like to specially thank to them for their contribution and support since the beginning.

My gratitude also goes to staffs and friends, who have been so supportive in all type of work that I do.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	ii
DEDICATION	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF SYMBOLS AND ABBREVIATIONS	ix
ABBREVIATIONS	xi
CHAPTER 1: INTRODUCTION	1
1.0 Introduction	1
1.1 Boost Converter	2
1.2 Boost Topology	3
1.3 Power Electronic Devices	8
<i>1.3.1 Common Power Semiconductor Devices</i>	9
<i>1.3.2 Diodes</i>	10
<i>1.3.3 IGBT/Switches</i>	11
1.4 Pulse Width Modulation (PWM)	12
1.4.1 <i>Analog Circuit</i>	12
1.4.2 <i>Digital Control</i>	13
1.5 Objectives	16

CHAPTER 1

Introduction

1.0 Introduction

The task of power electronics is to process and control the flow of electric energy by supplying voltages and currents in a form that is optimally suited for user load. Figure 1.1 shows a power electronic system block diagram. The output of the power processor is a function of voltage, current, frequency, and the number of phases is desired by load. Feedback controller is commonly used to compare the output of the power processor unit with a reference value. Hence, the difference is the error between the two can be minimized by the controller.

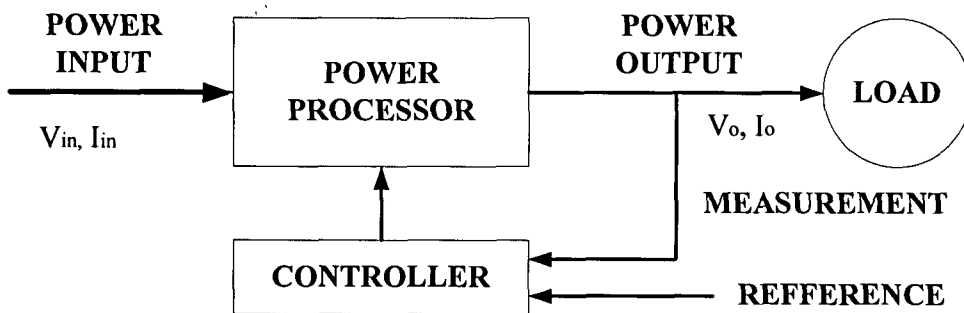


Figure 1.1
Block Diagram of Power Electronic System[1]

The field of power electronics has experienced a large growth due to confluence of several factors. The controller consists of linear integrated circuit and/or digital signal processor[2]. Modern semiconductor technologies have made it