A Comparative Study of Fuzzy Logic Controller and Proportional Integral Controller on Buck- Boost Converter

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ABSTRACT

This thesis is presents a comparative study of Fuzzy Logic Controller (FLC) and Proportional Integral Controller (PIC) on Buck- Boost Converter. The objective is to find comparative performance of both controllers on Buck- Boost Converter. The model circuit of Buck- Boost Converter with FLC and PIC has been derived to analyse the effectiveness of the controls methodology. The controls methodology is then verified by numbers of simulations and the advantages good response time in term of shortest rise time, settling time, smaller overshoot and less voltage deviations are indicated in comparison FLC with a conventional PIC. Simulation is held in MATLAB- SIMULINK environment.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Project Overview

Recently, the control systems for many power electronic appliances have been increasing widely. Crucial with these demands many researcher or designer have been struggle to find most economic and reliable controller. The idea to have control system in DC / DC converter is to ensure desire voltage output can be produce efficiently to meet the demand need. Basically, feedback controller compares the output of the power processor unit with a reference value, and the error between the two is minimized by the controller. Figure 1.1 shows a power electronic system block diagram.

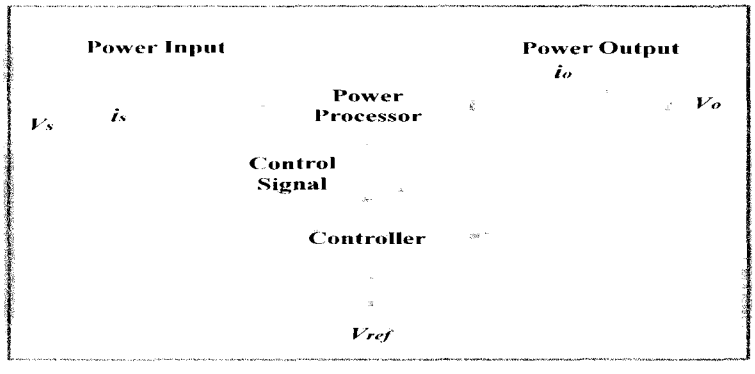

Figure 1.1: Block Diagram of Power Electronic System

Conventionally, PI, PD and PID controller are most popular controllers and widely used in most power electronic appliances but disadvantage of PID that is requires complex mathematical model of the control process or may be expensive in terms of computer processing power and memory, and a system based on rules based likes FLC may be more effective. DC / DC converters have been dominating controlled by analogue integrated circuit technology and linear system control design techniques [1].

Continuous development of advanced high-speed digital circuits, digital control will slowly replace the currently used analogue controller in high frequency switching converters. Intelligent power supplies are expected to play important roles in aerospace, communication and automobile industries in the near future [2].