

**DEVELOPMENT OF FUZZY LOGIC CONTROLLER  
FOR IMPROVING THE PERFORMANCE OF  
WARD LEONARD SPEED SYSTEM**

**Thesis presented in partial fulfilment for the award of  
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## **ABSTRACT**

This project concerns about developing a fuzzy logic controller for a Ward Leonard speed control system. Many engineers have tried to use conventional PID (Proportional Integral Derivative) controller to control this system previously, but not successful because the control task is non-linear. First part of this paper will cover the basic knowledge of fuzzy logic sets followed by translating the crisp data into linguistic variables under fuzzification section. The defuzzification is to change back the linguistic variables result into a real value that represent the power setting of the motor in kilowatts. The discussion is limited only to the development of software. The hardware part is discussed in another part of this entire project. Because of limited time, the hardware part was not completed. Only the software part is completed which involves the cross debugging between C-language code and the fuzzy software tools.

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## CHAPTER 1

### 1.0 INTRODUCTION

#### 1.1 Introduction

Although the main objective of this research is to investigate the application or implementation of fuzzy logic controller into Ward Leonard speed system, but it is better to understand the models of fuzzy sets and its introduction as well. Fuzzy logic has been described and examined for nearly 31 years, it has only recently appeared in the popular and technical press [1]. Fuzzy logic theory were introduced by Prof. Lotfi Zadeh in 1965 [2], to represent and manipulate data and information that process non-linear and uncertainty.

The word fuzzy originally meant “like or having fuzz”, and only later came to mean “blurred or unclear ideas”. Fuzzy logic adopts its name from this second definition [3] it starts out with an uncertain idea, then transforms it into something clear and useful. It (fuzzy) has solved many complex system problems, and made their behaviour more understandable especially in industrial control systems. Where almost every position of the industrials need to be controlled by a control system, especially in complex and uncertain system. In reflecting to the complex system with a risky environment for human being to handle, fuzzy logic controller has solve the problem by controlling the system, approximately human being.