FUZZY LOGIC CONTROLLER FOR CONTROLLING WARD LEONARD SPEED

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ABSTRACT

This poject is to improve the performance of Ward Leonard speed control system to control a DC motor. This motor was controlled by PID (Proportional Integral Derivative Controller). Under the conventional method, the performance of PID is slow to pick up the speed hence the Ward Leonard, Fuzzy Logic Controller (FLC) is used to replace PID controller. This project has benefited many industrials and businesses like Multi-Expert Decision Making, due to its advantageous, which range from very small, micro controller based systems in home appliances to large-scale process control systems.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A Ward Leonard speed control system provide with its own separate dc generator to vary the armature voltage of a dc motor. An a.c motor served as a prime mover for a dc generator that supplies a dc voltage to another dc motor. With such a flexible arrangement, total motor speed control is possible [1].

Proportional-Integral-Derivative (PID) is most commonly used in industries of process control. Three basic control action functions will be used in different combinations in most applications. The three functions or modes are proportional action, integral action and derivative action. This controller is based on the mathematical equation, in which every term of control with different equations is used. A controller using all three functions is called a PID or three-term controller [2].

In recent years, fuzzy theory has emerged as a powerful tool in various control system applications [4]. Researchers are starting to use fuzzy control in various power system application areas [5]. The application of fuzzy logic control techniques appears to be very useful whenever a well-defined control objective cannot be specified or the system to be controlled is very complex. Under traditional laws of logic, something either belongs to a set or does not, thereby leaving no room for ambiguities. Answers to questions are often "maybe" instead of "yes" or "no". Terms such as warm, cool, partly cloudy, and partly sunny are often used to discuss various weather phenomena [6]. Contrary to traditional logic, where boundaries are rigid, fuzzy logic not tolerates, but is based on the looseness of boundaries.