

**FUZZY LOGIC CONTROLLER DESIGN
FOR SEESAW SYSTEM**

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ABSTRACT

This report deals with the Seesaw system that would be controlled by Fuzzy Logic Controller (FLC). The objective of this project is to control the Seesaw position so that it remains in horizontal position. In order to achieve this objective, the Fuzzy Logic Controller would be designed by using the existing software known as FuzzyTECH software. Towards the end of this project, the comparison would be done between the PID controller and the Fuzzy Logic Controller designed in terms of their performance.

Previously, the Conventional Controllers have been applied to achieve this objective. In fact, this conventional controller has proven to give a very good result. The most commonly used conventional controllers in industrial process control system are Proportional + Integral + Derivative (PID) Controllers. It is preferable due to its simple structure and robust performance.

Fuzzy logic Controller is designed to reflect the reasoning and action of human operator. More precise, the fuzzy control is constructed from knowledge based rules combined with control strategy to achieve control purpose. The knowledge-based rules expressed in a near-natural human language format are the know-how of a human operator concerning the manipulation of that particular system.

It has been proven to be successful in many applications in which the conventional control method could not give a satisfactory performance. Fuzzy controllers show superior performance especially systems that are non-linear, complex and unpredictable.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In many years back, most of the control systems have been using the approximate mathematical model to describe its physical process. This is successfully proven by the researchers and theorists. The conventional methods are always preferable in solving control problems. To be more specific, in conventional method, the control system is first modeled analytically by a set of differential equation and their solution tells the conventional controller how to adjust the system's parameters for each type of behavior required.

However, in designing a conventional controller to meet the system's requirement is not an easy work to be done. This is because in many cases of designing, it was proven that the process of designing is too complex or poorly modeled to meet the accuracy of the system. Besides that, too many tuning parameters are involved and it needs a very long time to obtain the results.

Therefore, Fuzzy system is introduced by *Sir Lotfi A. Zadeh*, a professor at the University of California at Berkeley in a 1965 paper on Fuzzy sets. Fuzzy system is introduced to overcome the problems given by the conventional controllers. Since then, the introduction of Fuzzy Logic, rule-based Controllers have been extensively developed using fuzzy logic to mechanize linguistics reasoning of human experts. The benefits of fuzzy logic control theory have made this technique very attractive and useful for solving non-linear control problems. Many big processes have come out with impressive results after applying this fuzzy system such as Non- Linear Thermal Process Control, Aircraft Flight Control, Torpedo Control and so on [9].