REAL-TIME FUZZY LOGIC CONTROLLER FOR GLYCERIN BLEACHING PROCESS

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ABSTRACT

In this project the real-time temperature control system for glycerin bleaching process using Fuzzy Logic PD-Like Controller was presented. The NI Compact DAQ (NI cDAQ) and LabVIEW were used as an interfacing system for this work. 4-20mA current signal is used to control the heater of the tank. 9 Fuzzy rules were used to compare and evaluate the best and suitable set for this application. It was found that the implementation of PD-Like Controller with 9 rules is sufficient to give high performance of heating compared to PID Controller. The results show the Real-Time system is capable of controlling the Glycerin bleaching process.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

To maintain and control the set point temperature of a process is a difficult task. It has been known to be intrinsically challenging due to a variety of factors such as producing slow response [1-3] because of the thermal nature in the process. Furthermore, there will predictably be further lags or time delays before it reaches a steady uniform level [2], [4] following a change of an input.

The PID controller is the most common used controllers in process control field. The selection of P, I and D values will determine whether the process is oscillatory, stable or unstable [11]. Fuzzy Logic Controller is commonly used because of its intelligence. Fuzzy Logic uses the concept of degrees rather than strictly true or false to characterize variables of interest. The degree of membership of an object in a set is subjective in nature, a matter of definition and not necessarily measurement. The ability of fuzzy logic to capture system dynamics qualitively and execute this qualitative idea in real time situation is an attractive feature in the control of time delay system. [10]. The Fuzzy Logic Controller gives out faster response, more reliable and recovers quickly from system upsets. It also works well to uncertainties in the process variable. Fuzzy Logic Controller does not require mathematical modeling [5].