TEMPERATURE CONTROL USING PID GAIN SCHEDULING METHOD FOR GLYCERIN BLEACHING PROCESS

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ABSTRACT

The aim of the study is to design and implement the temperature control using gain scheduling method for glycerin bleaching process. In the field of process control system, it is well known that the PID controller have proved their usefulness in providing satisfactory control. The PID controller is by far the most common control algorithm. Most feed-back loops are controlled by this algorithm or minor variation of it. The combination of P, I and D term will improve the process performance and enhance the process controllability. Gain scheduling is very easy to implement in computer controlled system. Gain scheduling is a method to find auxiliary variables that correlate well with the changes in process dynamics. Then the controller parameters are determined at a number of operating conditions based on the scheduling variables that have been deformed. In this study, the controller has tuned using ITAE tuning method and several operating condition of controller correspond to the process gain a developed. The performance of the system was evaluated in term of percentage overshoot (%OS), rise time (Tr) and settling time (Ts) by comparing the response obtain before and after gain scheduling implementation. The result revealed that the implementation of gain scheduling can improve the performance of glycerin bleaching process.

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CHAPTER 1

INTRODUCTION

1.0 Background

Color is a major characteristic in preparation of hardened products from pure glycerin like margarine base stocks. Color pigments presence in the crude glycerin contributes the undesirable color effects to the quality of the finished product [1-2]. The glycerin bleaching process [3] is important for producing a light colored pure glycerin of acceptable quality.

Mechanically the glycerin bleaching process is carried out by adding the adsorbent to the reactor tank containing contaminated crude glycerin, stirring the mixture to achieve good contact of adsorbent with the glycerin and maintaining the temperature for a sufficient time before drawing off the bleached glycerin. The performance for glycerin bleaching process using adsorption method significantly depend on the properties of the crude glycerin to be bleached, dosage and type of absorbents used and the bleaching operating temperature [4].

Amongst, the operating temperature was the most parameter affecting the quality of finished bleached glycerin. This is due to the application of heat to the glycerin will creates more color formation which will decrease the nutrition values as the temperature increase [1-4]. In this case, good temperature control system for glycerin bleaching process is needed to avoid negatively impacting the bleached glycerin. It is known that