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TITLE:

EVALUATION OF DIFFERENT TANGENTIAL METHODS ON THE PERFORMANCE OF PID CONTROLLER'S TUNING (TEMPERATURE)

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ABSTRACT

Process control aims to control a process by measuring one variable and adjusting another variable. The objective of this study is to evaluate the effect of different tangential methods on the performance of PID controllers for temperature process control. The experiment's main goal is to run an open-loop to verify which method will produce the better result using tuning rules by Ziegler- Nichols. Besides, the disturbance will be decisive to determine which method has the most stable and fastest process. Furthermore, the SV change was stimulated to determine the best method between Tangent method, Reformulated method and Two- Point method. After getting the value from the tuning rule, the value of PB, I and D can be known. As the proportional band (PB) value increases, the process response (PV) will be slow and the process response curve shifts to the right. An increase in integral (I) would cause the PV being slower and the process response curve will be shifted to the right. Without the oscillations, the appropriate amount of derivative (D) action can quickly stabilise the process variable (PV) at the setpoint. As a result, when compared to the tangent method and the reformulated method, the two-point method yields the most accurate data corresponding to the tuning rules. In conclusion, it can conclude that the Two-Point method outperforms the Tangent and Reformulated methods in terms of performance and efficiency.

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CHAPTER 1
BACKGROUND

1.1 Introduction

Process control is a method of keeping key manufacturing process parameters at the desired set point. Any process element that can be controlled, such as heating and cooling, material flow rate and pressure, can be tuned using process control. Process control also automatically adjusts system conditions to return any measured deviations to expected values, also known as set points. Measuring devices, final control elements, and computers are common components of process control systems. As a result, basic process control elements have a direct impact on the process. The examples of process control elements that measure the process parameters are control valves, pressure and temperature sensors, flow meters, and other devices.

The temperature control systems are the most important part of many processes, and they are widely used in the industrial sector to automatically control large systems. In the industrial sector, proportional integral derivative (PID) algorithms are widely used in temperature control. Thus, it is a common method of process control in the industry. Temperatures will rise over time because the heat input causes the temperatures to rise. PID controllers' primary function is temperature control. The temperature control system will manage the heat transfer. This is because the greater the system of temperature control, the more effectively and consistently the system operates.

The PID controllers are instruments used to control variables such as pressure, temperature, flow and speed in industrial control applications. The PID controller's output is the result of a linear combination of P, I, and D control modes. PID Controllers are the most accurate and useful in many processes that control process variables (PV) using a control loop feedback mechanism. The benefit of PID control is that the process will have both small