DEVELOPMENT OF CONTROL SYSTEM FOR WATER LEVEL PROCESS PLANT

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ABSTRACT

The aim of this project is to study the control system for water Level Control Trainer System Model WCT-03N which installed at Process Control Laboratory, Faculty of Electrical Engineering, UiTM Shah Alam. The control system for the process plant is evaluated using ideal, serial and I-PD control structures method. The first order plus delay time (FOPDT) process model is obtained via open loop step response test. In order to obtain process model parameter, Two Point method is applied. Then, the PID parameters are adjusted using Ziegler-Nichols Reaction Curve tuning method. The MATLAB/Simulink is used as simulation to comparing the system performance for each PID control structure and the control system performance is analyzed in terms of the transient response by using the same process model.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In the industrial application, there are various process need to be controlled such as temperature, pressure, level and flow. Water level control system is wide used in many industrial nowadays. Various system and devices have developed for controlling the water level [1] to desired set point by controlling the pump that used to inject the water to the tank and measured it by sensor. The important parts of control water level are to the situation that requires fluid to be supplied to a chemical reactor at a constant rate and to maintain the water at desired level. It is commonly found in industrial process such as beverage, food, solution filtration and chemical production [2].

In the field of process control system, it is well known that the PID control method have proved their usefulness in providing satisfactory control [3]. The PID control is a combination of proportional, integral and derivative control. It offers rapid proportional response to error, while having an automatic reset from the integral part to eliminate steady state error. The derivative action will stabilize the controller and allows it to respond rapidly to changes in error [4]. This combination will improve the process performance and enhance the process controllability.

The reason to control a process is to have it behave in a desired way. This may involve the process becoming more accurate, more reliable or more economic. In some cases such as the uncontrolled process due to unstable controller will cause the process become worst and plant equipment may broke or damage. Hence, good control is necessary in order not to damage it which sometimes can cause extensive