ABSTRACT

The digital control system is a control system with digital signal processing inside. Many kind of examples digital control system such as speed control, temperature, position, etc. In digital control system learning need hardware to be a learning media with display and user interface for easily controlling and monitoring system output. So writer propose to build an angle control system hardware with a user interface.

In this final project will be made hardware angle control of pastic plate with Proportional Integral Derivative (PID) control method. The set point system is entered by using LabVIEW, then DC motor will rotate and act as an actuator. DC motor will produce wind power and will push a plastic plate as a plant system, then deflection angle of the plastic plate will be changed. Absolute Rotary Encoder sensor which is a feedback sensor will be used to detect the deflection angle. The output will be displayed by LabVIEW. Arduino as a microcontroller will process the error value from the reduction of set point value with feedback value from sensor. Kp, Ki, and Kd value is obtained by trial and error method, and it will be used with error value for reducing error steady value and speed up the response system.

In this system has done some experiments of PID control system for angle input is 30^o. The experiment has done without disturbance and by disturbance. Disturbance can be a temporary push at the plate or constant wind forces. In this experiments at the value of Kp = 1.82, Ki = 0.6 and Kd = 0.42 can result 9 seconds of rise time, 0% overshoot value, and 13 seconds of the settling time. Finally, when the experiment of PID control system with disturbance is done, the system will be able to reduce and attenuate the effects of disturbance.

Key Word : Absolute Rotary Encoder, angle, PID, DC motor, microcontroller.