

## ABSTRACT

*The Proportional Integral Derivative (PID) has been widely used in the industry due to its simplicity and reliability. The variety of application controls using PID has been widely accepted in existing industries. One application of the control technique with PID is to control the temperature and maintain it. When designing a control system you should pay attention to the active area and saturation area of the actuator. Saturation of the actuator can be a problem that causes a decrease in the performance and stability of the control system. Especially, if the control system contains integrators, such as PI control and PID control when saturation of the actuator occurs and the variable process (PV) has not reached the setpoint (SP), then the control will continue to integrate the difference between PV and SP which will result in a large overshoot and settling time increases. This phenomenon is known as integral windup. In this final project, the writer compares the control of PI with anti-windup modification and conventional PI control. Anti-windup is applied to reduce the effects of the integral windup. From the results of the study, it was found that by applying anti-windup modification it could improve the system response with three set points when the setpoint is 30 ° C the resulted in an improvement in the overshoot value from 7.6% to 6%. And when the setpoint is 35 ° C the resulted in an improvement in the overshoot value from 12.45% to 4.34%. And when the setpoint is 40 ° C resulted in an improvement in the overshoot value from 7.25% to 3.1%*

**Keywords:** *PI, Integral windup, anti-windup*