

## ABSTRACT

Digital control is playing very important role at process industries because of its advantages. It is supporting by the technology improvement of fix-hardware while the software flexibility and also its capability to integrate and differentiation low level signal motion. The digital control have also disadvantages such as the error state because of signal sampling and reconstruction, computation error because limit of data space, data cutting and register overflow. Due to that case, it will design a control system which have capability to identify and also verifying output system using PID controller.

At this final project will be analyzed motor DC respond from real-time operation modes using PID controller. Those modes including position control (mode 3), velocity control (mode 2), torque control (mode 1), and voltage control (mode 0). The performance result of simulation can be seen from stabilized analysis, transient time, delaying time, and settling time at different value of inputs. This is the main reason why we use PID control which have important role to optimize those transient parameter. In case of PID control best performance for our purpose, we must estimate PID parameters (tuning) based on planted system. In that case, I use Ziegler-Nichols algorithm based from oscillation curve method as reference for estimating PID control constants.

From the results of PID control simulation for servomotor DC using matlab , constants of PID  $K_p=5$ ,  $K_i=0.01$ ,  $K_d=0.00025$ , overshoot system minimalized up to 0.1 % from steady state, transient respond time accelerated 2 times, and stabilized of system at 3.15 % from various condition of inputs. With this simulation method can be considered as a very effective solution for hardware realization.

Key words : PID Control, Motor DC, Ziegler-Nichols