ABSTRACT

Proportional-Integral-Derivative (PID) is a control method that is simple and often used because of its simplicity as well. Parameters Kp, Kd, Ki the PID component must have an appropriate value in order to produce optimal output. The use of classical methods such as trial and error may be done, but certainly it will take quite a long time. Another case was when the third parameter is given a random value by using a genetic algorithm to perform self-tuning to produce optimal value and continue to make updates when the environment changes.

Self-tuning PID with genetic algorithm implemented in the Autonomous Underwater Robot for use in maneuvering system when walking robot to follow a path-plan where the input set-point that is used in the sampling error depends on the condition of the robot path. Thus Autonomous underwater robot will run stable, and self-tuning PID will continue to get better stability with ITAE method, MSE and maximum overshoot.

Simulation results test, the best chromosome of the genetic algorithm provides a proportional amplifier Kp = 9.839, amplifier Integral Ki = 1.977, and the derivatives that have a Kd = 1.242 risetime around 255ms, and a maximum overshoot of about 10:53 which is 105.3% and also reached SteadyState in 725ms. Tests were carried out on the robot in the last generation to have Kp = 3.84022, Ki = 0.64668, and Kd = 2.85692, with a value of 0.0049524 fitnessnya which time the sampling performed during the 9685 controller with 100 ms of data tercuplik. Fitness value in the last generation rose 107.39% of the first generation, also owned rise time of 387.4 ms, maximum overshoot amounted to 0.5499, steady state error of 0.2654 and a steady-state for 2614 ms.

***Keywords** : underwater robot, autonomous, pid, parameter, self-tuning*