ABSTRACT

Intelligent fire fighting robot on Indonesian Intelligent Robot Contest or the Trinitiy College Fire Fighting Home Robot Contest was a robot that has the ability to explore the arena to find and extinguish fire and then return to the starting point as soon as possible.

In order to complete this mission fast, the robot's navigation systems became very important. The robot must be able to maneuver well in exploring the arena to avoid collision with the wall which could cause the robot move slowly. One way to navigate the robot was keeping the robot to the closest wall so it remains at a safe distance by performing the position control of robot to the wall using PID control (proportional-integral-differential). The PID control was used to calculate the error value based on input from ultrasonic sensor placed on the robot, then its output was used to determine the value of the motor speed of the robot.

In this final project, a design and implementation of wheeled robot navigation system was produced using *wall following* algorithm based on PID. The best performance of the system was at a constant value of PID for P = 10, I = 0.04 and D = 25 with time sampling was 66.4 ms. Performance parameters of the system were td = 132.8 ms, tr = 154.9 ms, tp = 265.6 ms, ts = 863.2 and Mp = 30%.

Key words: sensor, wall following, PID control, robotics, microcontroller.