

## **ABSTRACT**

*A one-wheeled robot is a robot designed to keep the robot's weight equilibrium which focuses in one direction (back and forth). The implementation of the one-wheeled robot can be assumed as an inverted pendulum. The inverted pendulum is an unstable system and an equilibrium can be obtained by trying to get the center of gravity position above the fulcrum. Due to the unstable system of this inverted pendulum, a control is needed to set so that the system can keep vertical position against the reference position. In this research, the PID control will be used as a system control utilizes the difference of setpoint value and the present value of an MPU6050 sensor to stabilize the robot equilibrium. MPU6050 is a sensor which serves to read the angle values caused by the rotating body robot. In this research obtained that robot can balanced when without load and given load variaton. Giving the load aims to see to what extent the system can maintain stability when burdened. Without load condition is the most stable response with settling time 0,79 second, error steady state 1,6% and oscillation ratio 0,994%. Condition at 29 grams is maximum load that can be given to robot with settling time 1,21 second, error steady state 2,067 % and oscillation ratio 1%. When given load of 33 grams, the robot shows very large dynamic movement so that it pass through the test area with settling time 2,42 second, error steady state 1,76% and oscillation ratio 0,998%.*

*Keywords : single wheel robot, inverted pendulum, control PID.*