

ABSTRACT

In the current development of the robotics world, it is developing rapidly. Because the role of robots can already help the role of humans. Self-Balancing Robot (SBR) technology is a robot technology that can balance itself against the horizon by utilizing the momentum wheel, whose axis is attached in line with the robot's balance axis. By utilizing PD (Proportional and Derivative) controls to control the DC motor so that it can balance the robot.

In this research, a prototype tool will be made to assist the task of the human leg as a support for a two-wheeled vehicle. This tool has the ability to balance a prototype robot resembling a two-wheeled vehicle to be perpendicular to the horizon, this tool is commonly referred to as Self-Balancing Robot (SBR). In this study, the robot uses the PD (Proportional and Derivative) control method to help the momentum wheel (wheel axle) so that the robot remains perpendicular to the horizon. The force generated to balance comes from the wheel rotation which comes from the torque generated by the motor. The motor must have a large torque, so that the robot is balanced. This two-wheeled robot can stand upright by utilizing the MPU6050 sensor. This sensor can help in finding the tilt angle so that it can always stand perpendicular to the 90degree orientation to the horizon. However, the design of the momentum wheel combined with the MPU6050 has never been implemented in Indonesia. Therefore, this final project will try to implement the MPU6050 sensor in controlling the self-balancing robot using PD control and momentum wheel.

Keywords: *Self-Balancing Robot, PD Control, Momentum wheel, MPU6050*