

ABSTRACT

This research aims to model the stability control system of an electric motor's speed using Pulse Width Modulation (PWM) method. This method is chosen due to its capability in generating control signals to regulate the motor's speed. The research stages involve design, implementation, and evaluation of the system. The system design utilizes mathematical modeling and PWM-based control. The research results indicate the implementation of speed control of the motor based on PWM with trajectory angle variations. PWM values vary based on the conversion of input values from the MPU6050 sensor. This sensor consists of a gyroscope and accelerometer which function to read the position, velocity, both angular and linear, of the electric vehicle. Test results demonstrate that the motor operates at 150 rpm and 58 PWM before sensor integration. After integration, the speed varies between 150-154 rpm and PWM between 58-60. From the tests, it is observed that during downhill trajectories, the speed decreases, resembling an automatic braking system effect, thereby avoiding slips. Conversely, during uphill trajectories, the speed increases. Speed control by integrating the MPU6050 sensor into the system is also aimed at energy usage efficiency.

Keywords: Gyroscope, Microcontroller, MPU6050, PWM.