DESIGN OF MOTOR CONTROL OF RICE GRINDING MACHINE USING PID METHOD

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ABSTRACT

Indonesia is an agrarian country where most of the population are farmers. Rice production is the largest agricultural product in Indonesia, where rice is a basic need for humans which is converted into rice. To get the quality of the rice produced, the rice milling process must be carried out. There are several ways in the rice milling process, for example manual methods and using machines. Using a machine does have more advantages, including being able to produce a lot of rice and quickly. However, the use of diesel engines in rice milling also has drawbacks, including air pollution from diesel engine exhaust, noise, wasteful fuel consumption, and the engine speed cannot be regulated, causing the quality of the rice produced to be less than optimal, such as rice becoming uneven and crumbling. due to the non-constant rotation of the machine in the milling process. Therefore, the author makes a rice mill machine control device using the PID method. This tool uses an Arduino Uno microcontroller and a rotary encoder DC motor as the engine driving the mill. The use of this PID method is used to control the speed of the DC motor so that it can rotate stably according to the desired setpoint speed. To control the motor is done by using a push button. This push button is used as input that has been configured for the input setpoint and PID parameters in each push button, making it easier to operate the machine. The results of the no-load test for a setpoint of 60 RPM obtained a steady state error value of 2.5% and an overshoot of 0.83%, for a setpoint of 120 RPM a steady state error value of 0.66% and an overshoot of 0.41% was obtained, while for a setpoint of 170 RPM it was obtained steady state error value 0.29% and overshoot 0.58%. The results of the test with a load for a setpoint of 60 RPM obtained a steady state error value of 3.33% and an overshoot of 1.66%, for a setpoint of 120 RPM a steady state error value of 1.50% and an overshoot of 0.66% was obtained, while for a setpoint of 170 RPM it was obtained steady state error value 0.29% and overshoot 0.88%.

***Keywords**: Rice grinder, DC motor, Rotary encoder, PID, Arduino Uno.*