

ABSTRACT

With the growing needs of people, the technology was further developed from time to time. People increasingly want a condition where the job is not to do yourself but using a tool. It became one of the main triggers of the emergence of various inventions and competitions in the field of robotics. One of them is Indonesian Robot Contest. Contests between colleges hold a robot to pick up objects and place them in places that have been determined quickly and accurately in accordance with the contest theme that changes each year.

Distance and the amount of swivel wheels is a major concern, so the instrument electronics Rotary Encoder to be the main focus in this final project. Rotary encoder is used to change or convert the angular position into digital code. Rotary encoder will be in clutch with a DC motor so that the angle generated by a DC motor is directly readable by the rotary encoder. From the amount of swivel wheels with adjusting with the circumference of the wheel we will get the distance that traveled by the robot. That calculation will be processed by the microcontroller AVR, so that the output data type in the form of how far the robot will spin the wheel can be controlled. Stability control wheel will further use this type of control system PID (Proportional Integral Derivative). By using the PID control left and right wheel speed to be stable according to the desired program.

By using this navigation system robot can reach the position of the object (target) with a direct object with a parameter to the location of the distance difference between the position of the robot and the object. PID constants suitable to the stability control the system is $K_p = 5$, $K_i = 3.3$, $K_d = 227.5$ and $K_p = 0.5$, $K_d = 70$ for position control. The error that can happen is inertia $\pm 1 - 3\text{cm}$, $\pm 45^\circ$ slope error and position error $\pm 1\text{cm}$. This occurs because the influence of hardware that is not ideal, especially the design of the placement of rotary encoder and DC motor. Therefore, for Kontes Robot Indonesia this navigation system design is not appropriate to be implemented. In order to be used in the race, it is necessary improvements in mechanical design as well as an additional sensor like proximity, gyro, compass, or the accelero.

Keyword : Robot navigation, rotary encoder, DC motor, microcontroller, and PID