

ABSTRACT

ABU Robocon is a robotics competition in Asia - Pacific organized by the Asia-Pacific Broadcasting Union (ABU). In 2023, ABU Robocon is holding a contest with the theme "Casting Flower over Angkor Wat". The challenge of this year's competition is the obstacles on the playing field. A mobile robot based on mechanical wheels will be designed to be able to pass through obstacles on the playing field. Obstacles on the playing field include; flat surface, inclined surface with a slope of 18.43° and stairs. A comparison of the control methods between standard PID, PI Anti Windup, and PID with LPF Filter was carried out in the use of controlling the speed of the robot. The built mobile robot has dimensions of $48.5\text{cm} \times 46.4\text{cm} \times 48.9\text{cm}$. The mass of the mobile robot is 20.95kg. The best performance of a mobile robot designed to use PI Anti Windup control with digital LPF in walking on the playing field. The results of the built mobile robot can run with an average speed of 0.77m/s and have a stable speed seeing the standard deviation of the speed test data of 0.0879. The Mobile Robot successfully crosses the inclined surface with a duration of 8 seconds – 12 seconds. The success of the mobile robot in passing the stair – like obstacle is 0%. The failure of the stair climber system is caused by the mechanics of the actuator connection to the drive components.

Keywords: *mecanum wheels, mobile robot, control design, ABU Robocon 2023*