ABSTRACT

The use of mobile robots in industry continues to increase. One of the important features that a mobile robot must have when working in an industrial environment is the ability to handle obstacles so that there is no collision between the mobile robot and obstacles. Therefore, the problem of collision avoidance must be addressed. One way to design a collision avoidance system is to implement an appropriate control system on the mobile robot so that the mobile robot can avoid and prevent collisions with obstacles.

In this study, a real plant was designed in the form of a holonomic mobile robot with mecanum wheels. The control method used is Control Lyapunov-Barrier Function (CLBF) method which is a combination of Control Lyapunov Function (CLF) method and Control Barrier Function (CBF) method. The role of CLF is to obtain system stability, while the role of CBF is to maintain and improve system security. Thus, the CLBF method is used to combine the two roles of the two control methods to obtain stability and maintain system security. To see the level of success of the system, it can be observed through the pathway taken by the mobile robot.

To test the system, we carried out in four different initial condition points and given three circular barriers that have been determined first. The results of this final project have a success rate of 77.22% as measured by the comparison of the mobile robot position in Matlab simulation and the real plant implementation.

Keywords: *Blob Detection, Barrier, Control Lyapunov-Barrier Function (CLBF), HIL, Mobile Robot.*