ABSTRACT

THE DESIGN OF CONTROL SYSTEM WITH PID TO BALANCE BALL ON PLATE AREAS

Ball on Plate is a device that functions to adjust the position or position of the ball at the coordinates on a plate. Ball on Plate is an example of a control system application and generally used as a control system experiment.

The desired position is set by setting the setpoint at X and Y coordinates in pixel units. This system is a closed loop system. The control algorithm used is a PID control that will drive two servo motors so that the ball can go to the desired position coordinates. The Servo motor will continue to move as long as the error still appears. The error is calculated from the setpoint minus the coordinates captured by the camera. The implementation of image and control algorithm is doing on PC using OpenCV Library with Visual Studio application, while servo motor is moved through Arduino Uno which is serially connected with PC.

In this final task, it can be shown that the system Ball on Plate works well with the method of PID. The ball can go from eight with setpoint error steady state between 0.372277 pixel up to 5.66165 pixels. The ball can go eight setpoint from one point with error steady state between 0.140845 pixel up to 7.953642 pixels. From experiments conducted to be drawn the conclusion that there are still shortcomings is error steady state with a great value on this task.

Keywords: *Ball on Plate, Kontroler PID, Arduino, OpenCV, Servo Motor, Setpoint, Error Steady State.*