

## ABSTRACT

In the basic control system laboratory, the availability of teaching aids for practicums is still very limited, making it difficult for the practicum to run, especially during a pandemic which required students to study from home. Teaching aids are very important in the basic control system laboratory to make it easier to demonstrate a method accurately and easily to understand and also display system responses with IoT Thingspeak which will display system responses online.

The use of the PID control method is the goal of this work. The PID approach is employed in order to stabilize the ball control system on a flat surface. Ball on plate will place the ball in the specified position or location on a flat surface. The "Ball on Plate" system is made to move a ball across a flat surface in accordance with predetermined coordinates that are defined as X and Y reference points. Through image processing techniques, the webcam input is collected, and it is then sent serially to the microcontroller. The actuator, which is a servo motor, will then receive the output from the microcontroller and change the position of the ball in accordance with the received instructions. Based on the desired set point, the goal output is determined. The results will be shown on Thingspeak.

**Keywords:** ball on plate, PID, webcam, motor servo, IoT, Thingspeak