

## ABSTRACT

### ***DESIGN OF CONTROL SYSTEM FOR INVERTED PENDULUM STABILITY USING FUZZY LOGIC METHOD***

Naturally, the inverted pendulum is a dynamic system that is difficult to balance. However, using the system control method can achieve equilibrium. Thus, the design of the control method is the key to successful control of this system.

In addition to being difficult to balance this system is a tool that is greatly affected by natural phenomena and has nonlinear and relatively difficult to stabilize properties. Therefore, after the system reaches its equilibrium position the control system is also needed to maintain system stability with or without interference from outside or from within the system. Inverted pendulum can basically be designed in two forms, namely Linear Inverted Pendulum (transverse shape) and Rotary Inverted Pendulum (round shape).

In this final project, the inverted pendulum using the fuzzy logic controller method on the pendulum system corner stability and the constant gain method for stability of the cart position. The inverted pendulum system that is designed can also maintain its stability when it is impaired both the impulse signal and the pulse signal.

The result of the inverted pendulum system design that has been made is that the system can maintain the stability of the pendulum rod either with or without interference with max overshoot value is 50% for impulse signal disturbance and 89% for disturbance of pulse signal. However, in the stability of the cart system there is a steady state error after the system is interrupted.

**Keyword :** *fuzzy logic controller, linear inverted pendulum, max overshoot*