

ABSTRACT

The inverted pendulum has become one of the important research topics for control electronics engineers. The inverted pendulum system is a pendulum that is controlled with a certain force in order to stand in balance. The concept of control on the inverted pendulum is the same as the control on a rocket during take-off, it can stand upright in its equilibrium position. The inverted pendulum system is a highly unstable system. So, a good and reliable controller is needed to control this inverted pendulum system.

This final project focuses on designing PID control to stabilize the inverted pendulum in equilibrium position (stabilization control). The design of PID control is performed to obtain PID parameters, that are proportional gain (K_p), integral gain (K_i) and derivative gain (K_d). The PID parameters that have been obtained will be simulated in MATLAB and then implemented in the inverted pendulum system. The correct PID parameters can stabilize the inverted pendulum.

To verify the accuracy of PID parameters that have been designed, test and analysis of the inverted pendulum system are performed. Test results and analysis show that PID control can balance the pendulum well.

Keywords : inverted pendulum, PID control, stabilization