

ABSTRACT

DESIGN OF AUTOMATIC CONTROL SYSTEM FOR NUTRITION CONDITIONING OF DUAL PLANTS HYDROPONIC SYSTEM

The increase in human population from year to year makes agricultural land hard to find, especially in big cities, especially for people who live in densely populated areas, initially land that was originally used for agriculture turned into a place to build housing, mall and others. Hydroponics can be a solution option that can increase farmer productivity in Indonesia, but farming using this hydroponic method requires better handling, care and health than conventional farming using soil media. Meanwhile, the application of IoT technology is increasingly developing in Indonesia. In this study, an IoT-based hydroponic system will be built with the application of two plants consisting of lettuce and mustard greens as a model. The system consists of a hydroponic plant with a nutrient source controlled by the PID method and an IoT system as a monitor system that can be accessed online. This study uses the Ziegler nichole 2 tuning method to find the right K_p , K_i , and K_d . In this research, the PI parameter is used to reach the setpoint, with values of K_p : 120, K_i : 3 and K_d : 0. To see the response to the system, a disturbance is given in the form of a simulation of daily water absorption of adult lettuce plants, with the results showing the system response can reach The setpoint value is 800 PPM at plant one, and 900 PPM at plant two, both systems can maintain their condition in the error range of 1%. In addition, real-time factory conditions can be monitored via PC or smartphone using thingspeak as a medium for applying IoT.

Keywords: Hydroponics, PID, Ziegler Nichole 2, IoT