ORANGE FRUIT SORTER BELT CONVEYOR CONTROL SYSTEM USING CONTROLLER PROPORSIONAL-INTEGRAL-DERIVATIF (PID)

Hacky Theady Faiq Muhammad
Program Studi Teknik Elektro, Fakultas Sains & Teknologi
Universitas Teknologi Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail : hackytheady@gmail.com

ABSTRACT

In this day and age technology has become so important to help people's daily lives and of course every time this technology continues to change in order to perfect the previous technology. Especially in the plantation sector, where the fruit sorting process now doesn't have to be done manually but uses a belt conveyor. The advantage of this conveyor belt is that it can move fruit from one place to another quickly. In the process of sorting citrus fruits, generally the weight of the load that is sorted is of course different, with different weights, the speed for sorting the conveyor belt also sometimes slows down. To make the speed in the sorting process remain the same, in this study a tool in the form of a belt conveyor was made using the Arduino Uno microcontroller as a Proportional-Integral-Derivative (PID) controller with the Ziegler-Nichols 2 tuning method to control the speed of the DC motor to match the setpoint. A speed sensor (Rotary Encoder) is installed to read the speed of the DC motor as the conveyor belt drive, then this sensor will send data in the form of pulses in each rising condition in order to get an accurate speed calculation. In this study, the PID values were obtained, namely Kp = 39, Ki = 7.6, and Kd = 7. Then the test was carried out using or without load. The PID controller that has been designed in this study obtained a no-load system response value, namely overshoot 0.36%, rise time 2.08 seconds, settling time 3.09 seconds, and steady state error 1.8%. Meanwhile, for the load test, the results of the system response have an overshoot of 1.88%, a rise time of 2.4 seconds, a settling time of 3.89 seconds, and a steady state error of 1.72%. From the two test results, it shows that the system built has a pretty good performance.

Keywords : *PID, Speed, Ziegler-Nichols 2, Arduino Uno, belt conveyor*