DESIGN OF FRUIT STORAGE BOX TEMPERATURE CONTROL USING PI METHOD (PROPORTIONAL-INTEGRAL)

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ABSTRACT

Tropical fruit products are a promising business sector, therefore the fruit that has been harvested must be stored properly to maintain the freshness of the fruit. One of the factors that must be considered when storing tropical fruits is storage temperature. Tropical fruit is very sensitive to low or high temperature changes, the optimal temperature for storing tropical fruit is between 12-15^{o}C with a shelf life of up to 1 month. To maintain the optimal temperature, a device that is able to maintain the temperature of the fruit storage area is needed automatically. In this study, a tool will be made according to the needs of the seller in maintaining and caring for the stored fruit. The control process is carried out with Arduino Uno using PI control using the Ziegler-Nichols method. The DS18B20 temperature sensor will read the temperature and send it to the Arduino Uno. The results of the PI calculation in the form of PWM will be sent to the IBT-2 motor driver which will regulate the incoming voltage to the Peltier TEC1-12706 module so that the temperature can be stable at the desired setpoint, which is 13oC. The temperature is then displayed to a 16x2 LCD. Based on the tests carried out, the DS18B20 temperature sensor accuracy value is 96.64%, the system response to the PI controller is also obtained which has a settling time value of 167 seconds, a steady state error of 0.92% and no overshoot.

Keywords: *PI, Temperature, Peltier, Arduino Uno*