Rancang Bangun Alat Penetas Telur Otomatis Menggunakan Metode PID dan Fuzzy Logic Controller Berbasis Mikrokontroler

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ABSTRACT

The development of technology in the modern era as it is today has had a profound impact on social life. One of them is in chicken poultry farming, namely the creation of an egg incubator. Cultivation of chicken egg hatching really needs to be considered in terms of temperature stability, especially egg incubators that still use manual control or are still on / off. Control is still on / off results in a longer response time with the low level of temperature precision required for eggs to hatch, and the need for a manual schedule for turning the egg. From some of the problems above, this research will design an automatic egg incubator to maintain a more stable temperature. This tool uses the method fuzzy logic controller as temperature control that has been programmed on the ATMega328 microcontroller installed on the Arduino Uno with the LM35 sensor as the temperature value data input and two 25W incandescent lamps are used as heat sources in the incubator. The DHT11 sensor is used as input for humidity value data, and the DC fan uses relay as a moisture guardian in the incubator. This tool uses a DC motor and RTC (Real Time Clock) as an egg rack drive and RTC as a timer with the PID (controlling method proportional Integral Derivative). The results showed that temperature control using the FLC method could maintain the temperature in the egg incubator. The FLC control method has a better response than PID. In the FLC method, the time needed to achieve settling time is 9 minutes without overshot, and the steady-state error value is in the range of 0,35% - 1,62% of the value of set point 37°C. While the PID method with parameter values Kp=2, Ki=5, Kd =1 produces a temperature control response from the initial temperature reading to reach a settling time which takes 18 minutes and a value of overshoot 4,16% with a steady-state error value of 0,35% - 1,62% of the setpoint 37°C.

Keywords: *Egg Incubator, Fuzzy Logic Controller, PID, ATMega328*