

## ABSTRACT

The birth in early pregnancy and the lack of pregnancy nutrition can lead to birth problems and premature birth so that the baby easily induce hypothermia. Therefore, these babies require an incubator as a means of heating with standard temperatures between 32-37°C to help babies survive to be able to adapt to the outside temperature. Baby incubator on the market using on-off control on the heating system to control the temperature in the incubator. This method has the disadvantage that the transient response time of the position of living long enough to off or conversely. This process certainly requires a large enough power to turn on and turn off the heater continuously. Therefore, we need a technology that is capable of controlling temperature more effectively and efficiently.

To overcome these problems then apply temperature control techniques using Proportional-Integral-Derivative (PID). This technique will be applied to a prototype baby incubator. In this prototype, designed a baby incubator inside there is a two-piece box (top and bottom). Top box is used to put sensors and sensor display. While at the bottom of the box used to put electronic circuits, heater, and fan. The temperature sensor used is a space temperature sensor SHT11, while the temperature sensor is a sensor used baby NTC. Baby incubator temperature changes and can be seen in the form of the temperature display on the display device.

PID values obtained using the Ziegler-Nichols 1st method. Plant was given a unit-step input and the output response is obtained from the value of  $K_p = 13,827$ ,  $K_i = 0,576$ , and  $K_d = 82,962$ . This value is used into the heating system and the obtained time achievement 4 minutes 44 seconds with set point at 32°C. Hope in the future, this system can be very useful for nurses and hospitals, as well as the system can be developed again

Keywords: Baby Incubator, PID, Ziegler-Nichols