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Development of the PID controller and real-time monitoring system for a low-temperature furnace

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The PID controller and real-time monitoring system for a low-temperature furnace was developed. The system has two part, the PID controller, and the real-time monitoring part. An Arduino mega2560 microcontroller board was used for measuring and control the furnace temperature. A type-K thermocouple and a MAX31850 IC was applied for a furnace temperature measurement. The microcontroller board and a MAX31850 were connected via the One-wire bus for convert the temperature values and sent to a personal computer. The PID parameters can be varied by a user in the program, which developed by LabVIEW Software on a computer. The laboratory made furnace was established for testing the controller and monitoring system. The results have shown that the temperature with the range of 25-500 degree Celsius can be controlled. By the trial and error method with the PID parameters, kp was 250, Ti was 0.05 and Td was 0.20, the target temperature can be controlled with the maximum error of 1 degree Celsius.

Authors: PANGYA, Tommakran (091-8327296); THEDSAKHULWONG, Amorn

Presenter: PANGYA, Tommakran (091-8327296)

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