

Automatic Temperature Control in 3D Printing of the Polymer Details

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Abstract—In this paper it is designed the automatic system for formation the small pieces from polymer, based on the principle of thermoplastic extrusion. The system has a goal to form pieces with a maximum volume of 20535 mm³. Arduino Mega 2560 and an extension of Ramps 1.4 were used as the control module, and the control of the stepper motors is done by the A4988 drivers. The mathematical model of the thermal process in the extruder was identified and it was synthesized the PID control algorithm based on the maximum stability degree method and by the autotuning regime that is implemented in the controller.

Keywords— 3D printing; PID controller; PID algorithm; tuning methods; identification of the mathematical model; auto tuning

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