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Modified polynomial method to synthesize a control algorithm for a system model with first order inertia and time delay

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Abstract

In this paper, it is presented the procedure for synthesis of the control algorithm PI to the model of object with inertia first order and time delay, by the polynomial modified method. In the practice of automation the industrial and technological processes, the slow processes are usually approximated by the mathematical model, that represents the transfer function with inertia first order and time delay. It was elaborated the modified polynomial method for tuning the PI control algorithm to the model of object with inertia first order and time delay, which presents a simple procedure of calculation. To compare the obtained results, the empirical tuning methods, the Ziegler-Nichols method, the maximum stability degree method in analytical form and with iterations, and the parametrical optimization method of tuning the controller are analyzed. It is synthesized the control algorithm by the maximum stability degree method with iterations and polynomial modified method for the two case studies, there are analyzed the obtained results for the case of variation the parameters of the model of object. The advantages of the maximum stability degree method with iterations and modified polynomial method are highlighted.

Keywords: *tuning methods, degree method with iterations, polynomial method, performance, robustness*

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