SYNTHESIS OF THE PID CONTROLLER TO THE SYSTEM WITH MAXIMUM STABILITY DEGREE BASED ON THE GENETIC ALGORITHM

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The control problem in the various industrial applications is one of the most important problem, on which depends the high performance of the automatic control system. At the automation of the industrial processes in a lot of cases are widely used the PID controller and its variation. There are a lot of tuning methods of the PID controller and one of the tuning method is the maximum stability degree (GMS) method with iterations [1]. This method is graph-analytical methods which permits to obtain good performance of the automatic control, but this method require to be known the mathematical model of the control object. The tuning parameters of PID controller - k_p, k_i and k_d are the functions of known parametrs of control object and of the unknown value J stability degree of control system: $k_p=f(J)$, $k_i=f(J)$, $k_d=f(J)$. In case, when the control object is described by the transfer function with inertia second order the maximum stability degree method in the classic version [2] it is not applied. From these considerations, it was proposed to use the genetic algorithm for finding the maximum stability degree of the system. In the figure 1, *a* it is presented the transient process obtained for the case of tuning PID controller by the GMS method with iterations and in the figure 1, *b* it is presented the transient process obtained for the case of tuning PID controller by the genetic algorithm. It can be observed that for the case of using genetic algorithm it was obtained the transient process with lower settling time.

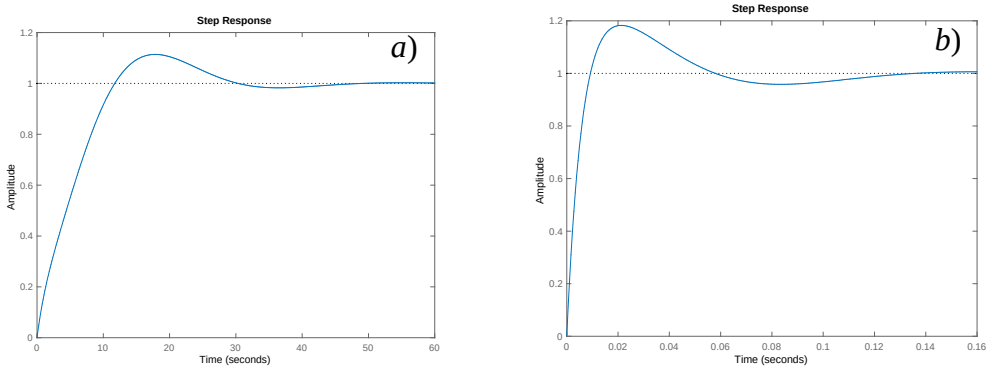

Fig.1. Transient processes of the control system.

Keywords: *maximum stability degree method, genetic algorithm, PID controller.*

References

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