Demkiv L.I.

INFLUENCES OF STANDARD LINEAR FORMS ON CHARACTERISTICS OF DYNAMIC SYSTEM WITH FUZZY MODAL CONTROLLER

To date, at the study of electromechanical systems the synthesis of the controller which ensures stability of the system as well as the desired transients is an important issue. One of the most common methods is the method of feedback. That is nonlinear system is replaced with the linear model and control synthesized for it is use to control a nonlinear model.

As it is shown in several scientific papers, most electromechanical systems can be described as two-mass model. At synthesis of full state feedback control for such systems a question of choosing the form of the distribution of the roots of the characteristic polynomial arises.

Studies show that system performance can be increased by applying predictive control approaches. Namely, by applying control actions, which are synthesized using a variety of standard characteristic polynomial depending on the size of the error of system's output coordinate.

The goal of this study is to compare the characteristics of a dynamic system with fuzzy controller, at combination of control actions that are configured for a variety of standard linear forms.

Based on the obtained results it can be argued that the use of intelligent control significantly improves the dynamic performance of the system.

The results obtained testify that it is preferable to use a system which consists of of three subsystems: subsystem with controller that is configured for standard linear form , which ensures maximum performance (at large deviations) , the controller subsystem that is configured for standard linear form of the Bessel (at small deviations) and the controller subsystem that is configured in a standard form that provides the minimum of the integral square error. In this case, the payoff can be achieved to 1.82 times in comparison with the standard binomial form to 1.15 times in comparison with the standard form Butterworth , 1.23 times in comparison with the standard form of Bessel 1.15 times in comparison with the standard form of Chebyshev 1.14 times in comparison with the standard shape, which ensures the highest performance and to 1.72 times in comparison with the standard form that provides a minimum error control.