RESEARCH ROBUSTNESS OPTIMAL CONTROL SYSTEMS THERMAL OBJECT

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The mathematical model of control object that describes the temperature regime tilted diffusion sugar factory settings and flashy sources of uncertainty parameters. Past studies of the optimal control system regulator, which is synthesized in minimizatsiyi N∞ standards-transfer function of the system showed the feasibility of its use by the action of various kinds of perturbations and when changing the subject.

Heat object N∞ optimization, optimal regulator Robust quality, Robust stability, mathematical model.

Today an important place in modern process control theory has Robust theory. This is due to the ease of use of a linear model of control object where all the inaccuracies of the mathematical model of a real object controls are put in a class of uncertainties. There are various methods of optimal synthesis tarobastnoho regulator in the state space, including H2, N∞ optimization, minimizing zvazhenyhnorm, anizotropiyni regulators. Based on the language of functional analysis, the optimal regulator sought despite the fact that the input and output actions are limited to some normi.Syntezovanyy regulator for each method is optimal only with limited relevant norms of input and output signals and their characteristics, the last non-appears static error in the control system.

Technological facilities operate under uncertainty, with only a fraction of them can be calculated numerically. For thermal process facilities management, mathematical model which describes the set temperature, an important issue is the quality and stability of the control system when changing the subject.

The purpose of the study. Rate the quality and stability control system with thermal control object that synthesized by the criterion of minimizing N∞-norm

closed system when changing the subject. The object of study taken mathematical model of heat diffusion regime tilted sugar factory installation capacity of 3000 tons / day, which is equipped with four steam bath.

The methodology and findings. Consider the mathematical model of control object in the state space.

During operation of the designed control system additionally there are errors that give rise to operational uncertainties:

- Errors primary and secondary temperature converters;
- Error control device digital converters (ADC, DAC, Zyp, etc.);
- Error lines controls;
- Error calculation control device.

All these uncertainties are invested in operational accuracy class vidpovidnyhtehnichnyh devices and their total error can be calculated.

Then the rule 3□ absolute error is defined technical system, through which describes the statistical uncertainty of the system.

Calculate all the technological uncertainty management system is not possible, and can only be described with some certainty of uncertainty as the biggest technological ob'yektau vidsotkud of matrytsiA0 thatcan be represented in matrix formiintervalnoho family:

For the diffusion temperature selector mathematical models vary within 30% of the calculated values.

The structure considered typical nonlinearity that always exist in the real system control, as well as models of sensors for measuring temperature and their noise. Suboptimal regulator K, schosyntezovanyy while minimizing N∞-normynominalnoyi transfer function of the closed systemyvid external disturbance w (t) to the controlled output z (t), is:

where the controller parameters are calculated for 2-Riccati approach [2] .Pry received this criterion value control is :. The modeling system was under different external disturbances, statistical signal with stationary characteristics and harmonic signal. As seen from families transients (Figure 2), the deviation of controlled outputs

z (t) is so small that it can be neglected, given the scope and parameters uncertainty of mathematical model of control object has little effect on the results.

Conclusion.

When using an optimal regulator, synthesized by the criterion of minimizing the norm N∞-transfer function of the closed systemyvid external disturbance vector to vector kontrolovanyhvyhodiv, quality indicators transients management system meet the technological requirements of the process. The stability of the system is lost when changing the mathematical model of the object to the specified percentage. When introduced nonlinearities in control significant changes were observed.

Consequently, research has shown efficiency and feasibility of N∞-optimal regulator for hot object.