THE SYNTHESIS OF LINEAR REGULATORS FOR APERIODIC OBJECTS WITH TIME DELAY ACCORDING TO THE MAXIMAL STABILITY DEGREE METHOD

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Abstract. The synthesis algorithms of linear regulators for a large class of aperiodic objects'models with time delay is proposed in this paper according to the maximal stability degree method of the monovariable designed systems.

The synthesis algorithm of linear regulators represents an algebraic method which consists of two stage.

On first stage the numerical value of the maximal stability degree of the designed system is determined.

On second stage the numerical values of tuning dynamic parameters of regulators is determined from algebraic expressions.

Key words: the aperiodic object's model with time delay, regulator, the synthesis of regulators, the tuning parameters, the maximal stability degree.

1. INTRODUCTION

The large class of aperiodic objects'models with time delay is studied in this paper. The class of models is presented through four types of models. The mathematical models of objects which are represented by the transfer functions are presented in the second column of the table 1. In the transfer functions we mark in: k is the amplification factor; T, T_1, T_2, T_3 are the time constants of the respectively objects; τ is the time delay of objects; n is the number of the identical elements in the object.

From the analysis of table 1 is observed in lines one, two and three the model of objects with time delay of respectively one, two, tree order are included, and in line four the model of object with time delay and n identical elements are presented.

We consider that for the types of objects presented in the table 1 with known parameters it is necesary to tune the linear like *P, I, PI, PID* regulators and to determine the tuning dynamic parameters.

In the (Zagarii G.I. and Shubladze A.M., 1988) the method of maximal stability degree of the designed system is used for tuning of linear regulators for the class of first order aperiodic objects with identical elements and time delay.

In the (Izvoreanu B., *et al.*, 1995a; Izvoreanu B., *et al.*, 1995b; Izvoreanu B., *et al.*, 1996a; Izvoreanu B., *et al.*, 1996b) the method of maximal stability degree is spreaded for the types of linear regulators *P, PI, PID* for the different categories of objects.

So, the purpose of this article is the generalization of the results which have been obtained in the (Izvoreanu B., *et al.*, 1995a; Izvoreanu B., *et al.*,