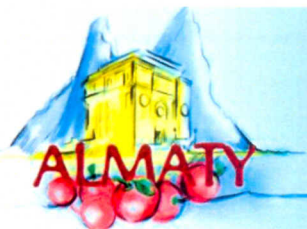# Third International Conference on Analysis and Applied Mathematics

ICAAM 2016

THE ABSTRACT BOOK

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3 MATHEMATICS EDUCATION 185

5 MS1:MATHEMATICAL MODELLING 223

Instability of control system in the neighborhood of program manifold

Sailaubay ZHUMATOV

Institute of Mathematics and Mathematical Modeling, Kazakhstan
E-mail: sailau.math@mail.ru

Abstract: We will consider the problem of construction of the steady systems of automatic control on the program manifold. Given program $\omega(t, x) = 0$ is performed only subject to condition, if initial values of the state vector of the system satisfies to equality $\omega(t_0, x_0) = 0$. But these equalities can be not always performed. Therefore at the construction of the systems of differential equations it is necessary to have some requirements on quality properties of the program manifold as stability, convergence, dissipatedness relatively to some function. To the construction of the systems of differential equations on the program manifold, possessing properties of stability, to the optimality and establishment to estimations for quality of transient's indexes in the neighborhood of program manifold, were devoted great number of works. The review of these works is conducted in [1 - 3].

In this work the control system with respect to vector-function ω is investigated with nonlinearity $\varphi(\sigma)$, satisfying to the local quadratic conditions. For this system was built Lyapunov function of the form

$$V(\omega, \xi) = \omega^T L \omega + \int_0^\sigma \varphi^T \beta d\sigma,$$

where $L = L^T$, $\beta = diag(\beta_1, \ldots, \beta_r)$ are matrices not necessarily sign definiteness. The sufficient conditions of instability are obtained with respect to vector-function ω by means of this function.

Keywords: program manifold, automatic control system, absolute stability, Lyapunov's function

2010 Mathematics Subject Classification: 34K20, 93C15, 34K29

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On stochastic stability of the integral manifold under permanently acting random perturbations

Marat TLEUBERGENOV [1], Gulmira VASSILINA [2]

[1] *Institute of Mathematics and Mathematical Modeling, Kazakhstan*
E-mail: marat207@mail.ru
[2] *Al-Farabi Kazakh National University, Kazakhstan*
E-mail: v_gulmira@mail.ru

Abstract: In this paper the stability in probability under an action of permanently acting random perturbations of the analytically given integral manifold is investigated. On the one hand these results generalize the theorems of stability under an action of permanently acting perturbations of the invariant set [1] in the class of ordinary differential equations. On the other hand they extend the theorems of stability under permanently acting perturbations of the unperturbed motion [2] to the case of invariant sets. To proof these theorems on stochastic stability under an action of permanently acting random perturbations of the analytically given invariant set we used the theorems in [3].

Keywords: integral manifold, stochastic stability

2010 Mathematics Subject Classification: 34H05,60H10

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