CONTENTS & ABSTRACTS

Lakeev A.V., Rusanov V.A., Kozerev V.A.

A continuous nonlinear infinite-dimensional dynamic system is considered. The system is defined in terms of the language of its behavior of «input-output» (a model of «black box») type. Various functional-analytical criteria of realization of this system in the separable Hilbert space in the class of quasi-linear stationary differential models with program-positional control are proposed.

Keywords: nonlinear differential realization, autonomous $(A, B, B^{\#})_2$-model, M_2-extension.

Furtat I.B.

The problem of adaptive control with reference model for some class of non-minimum phase systems is considered. It is assumed that only scalar input and output of the plant are measurable. The conditions that depend on parameters of the plant and the control system under which the control algorithm, designed for minimum phase plants, is functional for non-minimum phase systems are derived. The solutions are generalized to plants with delay. Examples of simulations are given.

Keywords: non-minimum phase plant, adaptive control, singularly-perturbed system.

Kuzmin O.V., Kedrin V.S.

The paper is devoted to research of features of structure analysis of harmonic series based on the definition of numerical rank correlated with the number of singular values significantly different from zero. The parallel between the numerical rank of the singular value decomposition and the final rank of a simple harmonic series is drawn. The results of analysis of patterns of additive and multiplicative models of harmonic time series are provided.

Keywords: time-dependent system, time series, singular value decomposition, singular spectrum, model structure analysis, separability.

Kosachev Yu.V.

The paper considers the problem of optimum management of innovation implementation process at the specified time interval within vertically integrated financial and industrial organization. Using a mathematical model of interaction between financial and industrial capital, the possibility of enhancing the effectiveness of innovation based on optimizing the structure of investment dynamics in venture capital is investigated. It is noted that at the same time the manufacturer's investment process is optimized to increase economic efficiency by reducing costs both at the stage of innovation commercialization and production of innovative products.

Keywords: optimal control, dynamic managed system, innovation, investment, commercialization of innovation, integrated financial and industrial organization.

Kornetova A.N., Chervonenkis A.Ya.

Every day a large number of ads from advertisers enters the search engine displaying ads machine. The main purpose of advertiser's ad is to be shown on the main search results page of the search engine (sponsored search) for such queries, that suites the main topic of the corresponding ad. The paper describes a new algorithm of ad selection for each search query to show on. The appropriate optimization problem was formulated, constructed and solved within the constraints of the current system, such as the total money derived from advertisers, and the proportion of queries, which ad can be shown. The criterion of optimality is the efficiency of advertising impressions, which is defined by users satisfaction and, therefore, the increase of their attention to the sponsored search on the main search page.

Keywords: click-through rate, sponsored search, Web advertising, CTR, optimization, algorithm construction.

Petrovets Yu.O., Andrianov D.L.

The paper presents the long-term optimal control problem arising in planning of railway infrastructure renewal. The paper also considers the method of solving based on the idea of branch and bound algorithm using dynamic programming approach to obtain bounds.

Keywords: railway infrastructure, optimal planning, brunch and bound algorithm, dynamic programming.

Volkovitskiy A.K., Karshakov E.V., Pavlov B.V.

The paper considers the method of relative positioning of moving object in a field of low-frequency electromagnetic source. Theoretical basis and base algorithm of angular and linear relative positioning are given. Practical results of high-precision distance and angles measuring in «towing aircraft — towed object» system are presented.

Keywords: relative positioning, electromagnetic system, moving object.

Somov Ye.I.

The paper considers principle aspects of control law synthesis for respinup of a satellite to combine the angular rate vector, directed on its body maximum inertia axis, with any given unit into inertial reference frame. Only weak internal torques are applied and the torques are generated by gyromoment cluster with bounded resources.

Keywords: spacecraft, internal control torques, respinup.

Aliseychik A.P., Pavlovsky V.E.

The paper examines the controllability and dynamics of the six-wheel mobile robot, designed for high-speed driving on rough surfaces, and its control synthesis. The analysis of the dependence of movements comfort on various characteristics of the suspension has also been conducted. Six-wheel robot dynamics model, based on the software package «Universal Mechanism» is investigated.

Keyword: six-wheel machine, motion simulation, «Universal mechanism».

Ivanov V.P.

On the basis of analysis of long-term collective researches, led by Boris Petrov, some thoughts on relationship between fundamental science, applied research and control systems design practice are given.

Keywords: fundamental and applied research, rocket and space technology, on-board control system design.