

# CONTENTS & ABSTRACTS

## FUZZY MATHEMATICAL PROGRAMMING: A BRIEF REVIEW . . . . . 2

**Shvedov A.S.**

The survey is given of several fuzzy mathematical programming chapters. It is observed that related to fuzzy mathematical programming are the mathematical programming tasks being formulated with the use of the fuzzy set theory concepts in any way. Considered are the tasks with soft constraints, tasks with fuzzy parameters, ranking functions, possibility measures. Fuzzy random mathematical programming tasks are discussed on the example of securities portfolio selection problem.

**Keywords:** fuzzy mathematical programming, possibility measures, fuzzy random variables.

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**Zhelezov K.O., Khlebnikov M.V.**

The design problem for linear control system with uncertainties in the system coefficients and exogenous disturbances is considered. The solution technique is based on the invariant ellipsoids approach. The efficacy of the proposed method is demonstrated via the benchmark problem for the aircraft model.

**Keywords:** linear control system, linear matrix inequalities, invariant ellipsoids, bounding ellipsoids, robustness.

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**Chestnov V.N., Samshorin N.I.**

The problem is considered of output controllers design for linear multivariable systems with deviating in prescribed bounds physical parameters of the plant, and subjected to the influence of unknown polyharmonic external disturbances, limited only in power. The controller is built so that to provide the prescribed bounds of mean-square values of controlled variables in addition to the robust stability of the closed-loop system. The problem solution is reduced to the  $H_\infty$ -optimization procedure produced in some specific way. The solution of the well-known «benchmark» problem is considered.

**Keywords:** robust stability, oscillation index, external disturbances bounded in power,  $H_\infty$ -control.

## MANAGEMENT FRAMEWORK OF INTER-REGIONAL PROJECTS AND PROGRAMMES PORTFOLIO IN RUSSIA . . . . . 26

**Murinovich A.A., Loginov M.P.**

The necessity is considered of portfolio approach application for inter-regional and regional projects and programmes management in the federal district territory. The peculiarities are given of inter-regional projects portfolio management, the specific features are spotted of projects' selection, realization process planning, and the portfolio operational management.

**Keywords:** portfolio, inter-regional project, projects and programmes portfolio management, project selection, planning.

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**Tolok A.V., Tolok N.B.**

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**Keywords:**  $R$ -function,  $R$ -functional modeling, voxel, local geometrical characteristics, the functional voxel method, functional voxel model,  $M$ -image, mathematical programming.

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**Keywords:** system-area supercomputer networks, complete multiring, generalized hypercube, flattened butterfly, parallel of network, network diameter, network throughput, channel fault-tolerance.

## USING MATHEMATICAL MODELING TO ASSESS THE EFFECTIVENESS OF ANTI-TUMOR VACCINE THERAPY METHOD . . . . . 49

**Babushkina N.A., Glumov V.M., Kuzina E.A.**

On the basis of the antitumor vaccine therapy mathematical model the algorithm is developed for calculating the dosage and viral vaccine introduction moment, at which the immune system response to the virus and infected tumor cells is the most effective. The method is developed of calculating the experimental tumors maximum allowable size, the excess of which reduces the efficiency of the vaccine therapy. The method is based on the mathematical description of the dynamics of fast-proliferating tumor cells fraction decrease with the increase of the tumor size. The graphs are plotted showing the changes of the immune system stimulation effectiveness depending on the dosage and vaccine introduction moment, and allowing the optimal control of the immune response dynamics during vaccine therapy.

**Keywords:** mathematical model, tumor cells, antibodies, vaccine introduction moment, vaccine effectiveness, immune response, virus, vaccine therapy.

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**Keywords:** terminal control, systems dynamics, asymptotic stability.

## EVALUATION OF DYNAMIC PROCESSES IN CONTROL SYSTEMS OF THE FUEL EXPENDITURE IN MONOBLOCK LIQUID ROCKETS AT FLYING-DESIGNER TESTS . . . . . 64

**Muranov A.A.**

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**Keywords:** carrier rocket, flying-designer tests, control system by the expense of fuel, method of analysis.

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