CONTENTS & ABSTRACTS

Zhukov V. P.

New sufficient and necessary conditions for asymptotic stability of equilibrium states of autonomous dynamic systems governed by Cauchy-type ordinary differential equations of any order are derived. The application of a special function class (instead of Lyapunov functions) allowed to prove the asymptotic stability converse with clear geometric meaning.

Ismailov I. G.

A new algorithm of approximate cycle construction for autonomous nonlinear ordinary differential equations system is established. It is a locally convergent algorithm effective for unstable cycles.

Gavrilova T. L., Kleschev A. S.

The paper considers several approaches to mathematical knowledge correctness problem available in mathematical practice, mathematical and computer logic. It discusses mathematical knowledge correctness criteria: universal, intuitive, logical, logical-formal, and computerized ones. The paper shows that the computerized criterion provides potentially the most reliable way to ensure mathematical knowledge correctness, and that the man-machine systems for theorem proving are the most promising way of its application. It finally outlines future steps to solve the problem.

Blyumin S.L., Shmyrin A.M.

The paper discusses an approach to allowing for neighbourhood fuzziness based on discrete-time systems state with the help of fuzzy measures and integrals.

Burkov V. N., Burkova I. V., Popok M. V., Ovchinnikova T. I.

A new approach to discrete optimization tasks named network planning techniques is offered. The method is based on the opportunity to present multivariable functions as a superposition of several simpler functions. The superposition structure is presented as a network whose inputs correspond to arguments, while the outputs correspond to the function. The paper shows that if the network has a tree structure, then the solution is reduced to sequential solving of simpler problems. In the general case, it is proposed to transform the network into the tree by separating network vertexes. It is proved that the problem solution for the transformed structure delivers the lower bound of the original problem's objective function (in case of a minimization task). The technique is illustrated with the example of the known stones problem.

Maximov V. I.

The models intended for analysis and simulation of problems that arise in semistructured situations are discussed. The structure-objective analysis of a dynamic model of controlled situation development is presented. The techniques for searching vector controls that ensure purposeful situation development are examined.

Maximov V. I., Kovriga S. V.

The paper shows the application of structure-objective analysis for determining the development targets of a complex socio-economic object (a region) and identifying conflict domains between active situation participants.

Karibsky A. V., Mishutin D. Yu., Shishorin Yu. R.

Formalized financial and economic methods of controlling applied for planning and managing of business activity of integrated companies are considered. A formalized generic problem of accounting policy optimization is formulated and the design concepts of simulation budget models are described. The solution techniques for the budget optimization problem are discussed. An application example is included.

Zhukovskaya L. V.

The paper offers the methods and technology of conflict microsystems investigation subject to market uncertainty as well as the formalization of risk guaranteed decision that ensures system microlevel stability (equilibrium).

Golembiovsky D. Yu.

The paper analyzes the methods of portfolio management efficiency. It offers a system of axioms that enables to analysis the methods of portfolio management efficiency estimation mathematically. A method for management efficiency estimation is proposed based on calculating a benchmark portfolio for each investment portfolio, and an appropriate program is developed.

Sukhanov V. M., Firsova E. M.

The problem of developing adaptive control algorithms that provide the decomposition of space robotic module (SRM) model is considered. The SRM is a multivariate mechanical system. The paper offers the technique of controller retuning algorithm synthesis based on the concepts of searchless adaptation with a reference model. This ensures the desirable dynamics of module subsystems operation. The possibility of damping the elastic oscillations of the transported payload is investigated. The damping is implemented by nonstandard application of conventional actuators of the SRM's manipulator.