CONTENTS & ABSTRACTS

Talagaev Yu.V.

The approach is presented that uses superstability conditions for analysis and synthesis of continuous-time Takagi — Sugeno fuzzy systems. Practically important properties (behavior of solutions, robustness) of a superstable fuzzy systems class are studied. It is shown that the fuzzy regulator synthesis is reduced to solving a set of linear programming problems. The solution is obtained of problems of robust synthesis and fuzzy system state assessment in the presence of external bounded disturbances. The robust superstabilization problem solution is given for hyperchaotic system, represented as a fuzzy model.

Keywords: fuzzy system, superstability, analysis, synthesis, state estimation, robustness, bounded disturbances, hyperchaotic system.

Gubanov D.A., Chkhartishvili A.G.

This paper suggests further development of the actional model of user influence in social networks. According to the model, the influence and influence level of the individual agents (users) and meta-agents (subsets of users) are calculated on the basis of their actions taking into account the goals of a control subject (a Principal). Some properties of the influence function are studied. An example illustrates how the actional model can be applied to find the influence level of users in a real social network on the assumption of available initial data.

Keywords: social network, actional model, influence level, meta-agent.

Enaleev A.K.

The problem is considered of control polygons borders harmonization between different types of network partitions in large-scale network structures. The conditions are determined to provide lower management costs in a case of one partition type polygons borders matching another partition type polygons borders. Pointed out is that such tasks solving is relevant for investigating the problems of motion control and of transport infrastructure maintenance, in particular rail networks.

Keywords: hierarchy, control polygon, informational complexity of management, network partitioning, consistency of partitions, partition equilibrium system, optimization.

Payson D.B.

The number of instrumental aspects is considered of national space activity institutional environment organization structures analysis and synthesis, directed at its adaptation to changing economic conditions and at the effective industry structure forming. A complex format of actual conversion control problems description is suggested in a form of actor/level matrix, showing the space activity subjects hierarchy, ranged along the value chain, as well as horizontal interactions in a form of competition or integration. Using the abstraction suggested, specific features of vertical competition in high-tech industries are considered.

Keywords: space industry, space activities, structural reform, value chain, vertical competition.

Ratner S.V.

A method is proposed of network data envelopment analysis, adapted to solve the wide class of practice-oriented territorial environmental management tasks that require accounting and evaluation of mixed environmental influence of region economy. Evaluation is assessed of Russia regions complex ecological and economic efficiency, using the proposed method and alternative approaches, similarities and differences in the results are revealed, their possible causes are discuss. Revealed is that the developed approach main advantages in the context of environmental management tasks solving are: the possibility of component-wise assessment of the regional economic system economic and environmental efficiency, the possibility of taking into account the environmental load caused by population, while calculating the economic efficiency, and also the simplicity of numerical realization that does not require any special software and competence.

Keywords: data envelopment analysis, optimization, ecological and economic efficiency, regional economic system.

Mikrin E.A., Somov S.K.

The methods of operation reliability improvement are considered for the distributed real-time data processing systems. Features and characteristics of such systems are listed in comparison with operating in a normal mode data processing systems. Analytical expressions for such systems availability ratio calculation are obtained. The task is formulated of data reservation optimization in distributed real-time data processing systems.

Keywords: distributed data processing systems, real time, optimal data reservation, system availability ratio.

Vedeshenkov V.A.

The version of approach to diagnosing is developed, according to which the operable diagnostic monitor (DM) tests seven subscribers of digital system (DS) one at a time. After repairing the detected faulty subscribers, DM tests one by one seven fragments, each consisting of a commutator and four communication lines. Then DM decodes the tests syndrome derived and forwards the diagnosis to maintenance personnel for faulty components repair. Diagnostic test of each fragment consists of six check-ups and is independent from number of subscribers and commutators in DS.

Keywords: digital system, subscriber, commutator, communication line, fragmentary diagnosing, decoding.

Baybulatov A.A. Promyslov V.G.

The basic «Network calculus» theory rules are considered, having concern to queuing systems parameters calculations. The role of arrival curve (envelope) is clarified. A method of linear envelope calculation is proposed; the corresponding optimization problem is set and solved. Examples of one- and two-component linear envelopes calculations are given, as well as of corresponding service times (delays) and backlogs for I&C software queuing system.

Keywords: envelope, Network calculus, queuing system, optimization, I & C.

Gorlishchev V.P., Kalinin L.A., Michalski A.I., et al.

The problem is considered of calculating the electrocardiographic QT interval, normalized with respect to cardiac rhythm frequency, in order to eliminate correlation between QT and the cardio-cycle length (or the heart rate — HR). The regularized polynomial least square regression algorithm is suggested for normative QT interval value calculation with HR equal to 60 beats per minute. The result is given of applying this algorithm to conversion of the raw QT values into corrected QTk values. It is shown that the correlation coefficient between calculated values of corrected QTk and the cardio-cycle length is lower than that one, obtained from any known formulae. Thus, the way is obtained of valuating the QTk length that is almost completely independent from HR and can be recommended for clinical use.

Keywords: electrocardiogram, regularized polynomial regression, corrected QTk, QTk and RR interval correlation.

Kirin Yu.P., Kiryanov V.V.

Considered is the robust approach to spongy titan restoration and vacuum separation processes control, allowing to intensify the processes by increasing the temperature. The objects description is obtained in the form of interval dynamic model. Using this model, analysis and synthesis of robust control are performed, providing the guaranteed maintenance of processes maximum permissible temperature while uncertain parameters change in given intervals.

Keywords: spongy titan, restoration and vacuum separation, temperature condition, guaranteed preset value maintenance robust control.