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Algebraic structures generated by modeling programs are theoretically studied. The main new notion here is GAPS (General Algebraic Program System). Examples are given how to represent control systems as GAPS. Open problems: algebras of almost invertible processes; discretization and approximation of abstract infinite algebras by finite GAPS; classification of finite GAPS and methods of their composition and decomposition.

Keywords: algebraic programming, magmas, control systems, supercomputers, Landauer limit, Chaitin limit.

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Keywords: Big Data, Data Analysis, Big Control.

CONTROLLING THE FLOW OF REQUESTS FOR ACCESS TO BROADBAND MULTIMEDIA EDUCATIONAL RESOURCES IN DISTANCE LEARNING SYSTEM 24 I.P. Bolodurina, D.I. Parfenov

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Keywords: cloud computing, multimedia learning resources, load balancing, hybrid cloud system «OpenStack».

COMPUTER SIMULATION OF INTERACTION BETWEEN MUNICIPALITIES, REGIONS, GOVERNMENT AUTHORITIES. 31 V.L. Makarov, A.R. Bakhtizin, E.D. Sushko

The paper gives an overview of current multi-agent systems developed for analysis of typical problems of territorial entities. The multi-agent model of municipalities within a region where the agents are people and organizations in which they work is presented. The special consideration is given to providing a realistic simulation of the behavior of such agents as participants of production, as well as of the interdependence of behavior and state of agents of various types and environment changes. The example of using the model to test different options of vertical interbudgetary relations is given.

Keywords: agent-based modeling, testing of regional policy, human behavior in socio-economic environment, labor potential.

ON SOME ESTIMATIONS OF SHARE MARKET STABILITY AND THE INFLUENCE OF INVESTORS' INFORMATION AWARENESS ON THEM 41 V.A. Gorelik, T.V. Zolotova

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Keywords: collective risk, risk coefficient, average covariance, stability.

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P.V. Saraev, Yu.E. Syaglova

The paper gives the analysis of effectiveness of using results of time series neurostructural prediction (exchange rates) in hedging of currency risks using derivative financial instruments. Description of the developed software is given. The technique of computation of effectiveness of use of neurostructural predictions is considered. Results of computational experiments are provided.

Keywords: neurostructural modeling, time series prediction, foreign exchange hedging.

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I.O. Volkova, M.V. Goubko, E.A. Salnikova

As a part of managing behavior of an active consumer of electric power in prospective smart grids it is necessary to create a mathematical model that meets his or her economic interests. Existing models either do not take into account all relevant aspects or turn out to be too complicated for the purposes of multi-agent modeling. Mathematical model of an active consumer and its use for investigating the problem of consumption and local generation regimes optimization is proposed. The conditions when the consumer's problem has a pretty simple and efficient solution are derived. The proposed approach is illustrated by optimizing the operating modes of equipment for a single household.

Keywords: active consumer in power industry, Smart Grid, Demand-Side management, Demand Response.

THE CONSTRUCTION SCHEDULE FOR THE PERFORMANCE OF TASKS OF PARALLEL SYSTEMS OF MACHINES AND PRODUCTION LINES. . . 62 Yu.A. Zak

The development of Flow-Shop-Problem is considered. The mathematical model of scheduling for parallel working systems of machines under a given set of constraints on deadlines for separate tasks is considered. The properties of admissible and optimal schedules are examined and the methods of optimal scheduling by sequential optimization algorithms are proposed. The presented example shows the efficiency of the developed algorithms.

Keywords: parallel system of machines, Flow-Shop-Problem, limits on assignments, valid and optimal scheduling algorithms, sequential optimization.

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Keywords: mathematical modeling, complex-valued neural networks, neurocontrol.

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