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CONTROL OF EQUILIBRIUM STATES OF NORMALIZED BILINEAR MODELS 2

Kornoushenko E.K.

The class of so-called normalized bilinear models (NBM), which states and external influences are defined in the cube $[0, 1]^n$, and admissible controls — in the cube $[-1, 1]^p$, $p < n$, is considered. Assuming that controls and external influences on NBM are constant vectors, and NBM is asymptotically stable, the problem of finding controls that transfer NBM from any initial state to some equilibrium state which is close to some preassigned state is solved. The paper provides the procedures for conditions that are sufficient to solve this problem; such procedures are necessary for correct interpretation of the processes in NBM in accordance with qualitative scales $[0, 1]$ and $[-1, 1]$. The appendix contains an example illustrating all stages of solving the specified control problem.

Keywords: normalized bilinear model, asymptotic stability, controllable equilibrium state, admissible control.

INVESTIGATION OF OPTIMAL CONTROL PROBLEM FOR SINGLE AND DOUBLE INTEGRATORS OF FRACTIONAL ORDER USING THE PROBLEM OF MOMENTS APPROACH. 9

Postnov S.S.

The paper proposes the statement of optimal control problem for two dynamical systems of fractional order: single and double integrators. The problem is reduced to problem of moments. Basic equations and formula obtained which allow to derive the problem solution. Dependencies of control norm and minimal transition time from order of fractional derivative are investigated. Comparative analysis of results for both of considered systems is carried out.

Keywords: optimal control, moment problem, integrator, fractional derivative, fractional integral.

THE REGIMEN CONTROL TASK IN THE ECO-ECONOMIC SYSTEM «VOLZHSKAYA HYDROELECTRIC POWER STATION — THE VOLGA-AKHTUBA FLOODPLAIN». I. SIMULATION OF DYNAMICS OF SURFACE WATER DURING SPRING FLOODS 18

Khoperskov A.V., Khrapov S.S., Pisarev A.V., et al.

The hydrodynamic numerical model of the dynamics of surface water in the territory of the northern part of the Volga-Akhtuba floodplain is created. Time dependences of the area of flooding for different hydrographs are calculated and the different conditions of flooding area are investigated. These results are the basis of formulating and solving optimization and game-theoretic problem of flood regimen control for the eco-economic system «Volzhskaya hydroelectric power station — the Volga-Akhtuba floodplain».

Keywords: regimen control, dynamics of surface water, shallow water equations, numerical methods, the Volga-Akhtuba floodplain.

RESOURCE ALLOCATION MECHANISMS BASED ON STRATEGY-PROOF SYMMETRIC ANONYMOUS VOTING PROCEDURES WITH DELEGATION 26

Bondarik V. N., Korgin N.A.

The characterization of symmetric anonymous generalized median voting schemes which are suitable for resource allocation by voting with delegation — when any agent is allowed to announce not only whole allocation, which is the best to his opinion, but just several components of this vertex, is provided including the description of class of feasible delegation rules.

Keywords: mechanism design, strategy-proof allotment rules, strategy-proof voting rules, project management.

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Kisel'gof S.G.

In Russia from 2009 College admission is based on results of Unified State Exam. Entrant applies to no more than five universities. Admission mechanism is defined by government for all state universities. In the paper the authors model how entrant chooses university for application and, based on the entrant's choice prediction, the shortages of the current admission mechanism are revealed.

Keywords: matchings, college admission problem, entrants, Unified State Exam.

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Zhilyak A.V., Kascheev V.A., Kryanev A.V.

The paper provides the analytical terms for estimation of average time of service waiting \bar{T}_{line} in queueing systems (QS) that are derived as a result of some asymptotic task solution. Moreover, the simple expression which allows to evaluate the amount of QS service channels which are required to limit the average waiting time by define value \bar{T}_{line} are presented. The obtained re-

sults could be used for work optimization of large-size call-centers and other queueing systems with a generous amount of service channels.

Keywords: queueing system, call center, time of service waiting, Kendall's classification.

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Ambartsumyan A.A., Potekhin A.I.

Group control, as defined in this paper, refers to the control method for a set of autonomous components such that given technological function will be performed. The idea is to create a two-tier control system using models of component behavior on the lower level. Group control is implemented by a model of control component interacting with the lower level models. The paper discusses two types of group control. Sequences of joint operations and constraints on combinations of technological operations for autonomous components are defined respectively for the first and the second case.

Keywords: group control, discrete event models, Petri nets, self-contained components, complex systems.

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Zak Ju.A.

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Keywords: admissible and optimum sequences of task performance, restrictions on times of performance of works, ruptures in time of performance of works, consecutive algorithms of optimization.

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Makarenko A.V., Novoseltsev V.N.

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Keywords: mathematical model, natural technology, synergy, health, macrobiosis.

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Kychkin A.V.

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Keywords: pulse wave, monitoring, informative-diagnostic technology, expert system, fuzzy classification, simulation.

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Krutova I.N., Sukhanov V.M.

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Keywords: flexible spacecraft, mathematical model, gyrodine, gyro-force attitude control.

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Andrienko A.Ya., Belskiy L.N., Zaplatin M.I., et al.

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Keywords: digital system, terminal control, algorithmic protection, flight tests.

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