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RESOURCE NETWORK WITH MAGNETIC REACHABILITY

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We consider the model of resource distribution for homogeneous and inhomogeneous networks with limited reachability. Resource network called homogeneous if all capacity in the arcs are equal and inhomogeneous otherwise. We consider two kinds of resource networks with a restriction on the reachability: first, networks with accumulation of non-decreasing magnetism; second, networks with accumulation-disappearance of magnetism. The methods for finding of limit state for arbitrary total value the resource and threshold of resource network are developed for each type of distribution.

Keywords: resource network, flows in networks, flow distribution, nonstandard reachability, limit state, threshold.

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ESTIMATES FOR THE POTENTIAL-TYPE OPERATORS WITH OSCILLATING KERNELS AND SYMBOLS AND THEIR APPLICATION TO THE DESCRIPTION OF THE RANGES OF THESE POTENTIALS

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We study multidimensional potential-type operators $K^{\alpha,\beta}$ whose kernels have singularities on the unit sphere and oscillate at infinity. Operators of such a kind appear in various problems of analysis and mathematical physics, in particular, in the theory of complex power of second order differential operators: the Laplace operator, the Helmholtz operator and the Klein - Gordon - Fock operator. Within the framework of the method of approximative inverse operators, we construct the inversion of potentials $f = K^{\alpha,\beta} \varphi$ with densities in L_p in the non-elliptic case when their symbols degenerate on a set of null measure in R^n . We also describe the range $K^{\alpha,\beta}(L_p)$ in terms of the operator left inverse to $K^{\alpha,\beta}$.

Keywords: potential, method of approximative inverse operators, inversion of potential, discription of the operators range.

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THE CALCULATION OF THE INTERVAL OF THE FAIR PRICES FOR THE BINARY (B,S)-MARKET MODEL WITH VOLATILITY, WHICH IS MARKOV CHAIN

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The stochastic process which is based on the Markov chain and the random walk is considered in the paper. The Markov chain has the given matrix of transitive probabilities and the unknown vector of initial distribution. The problem of calculation of minimal and maximal values of the given function of this process is considered. The calculation example is resulted. The problem appendix in mathematical finance is also presented, as it is shown in the paper. The interval of the fair prices, which suit both the seller and the buyer of the European call option, is calculated. In several cases we deal with the unique fair price.

Keywords: Markov chain, volatility, random walk.

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USE OF THE METHOD OF COERCION WHEN MODELING INTERACTION OF CENTRAL BANK WITH COMMERCIAL BANKS

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Examines the interaction of Central Bank and commercial banks in sphere of crediting of the population. When modeling uses a game-theoretic and hierarchical approaches. As a method of hierarchical control is used, the method of forcing. Provided the algorithms for constructing the Stackelberg equilibrium in analytical study and simulation modeling. The results of analytical studies by the method of Lagrange multipliers for a special type of input functions and simulation for the input functions of general form. The analysis of the obtained results, a number of conclusions about the behavior of the whole system.

Keywords: hierarchy, two-level control system, Stackelberg, equilibrium.

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SIMULATION MODELING OF THE HIERARCHICAL CONTROL RULES (IN FISHERIES)

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Dynamic models of concordance of private and public interests (CPPI-models) in fisheries are investigated. Different information structures of hierarchical differential games on the example of a CPPI-model are described. Algorithms of building the Stackelberg equilibrium are proposed. The principal attention is given to the simulation modeling of different information rules based on heuristic algorithms. Numerical calculations are made, and the choice of simulation scenarios is explained. A comparative analysis of the numerical results for different information structures with test data is conducted.

Keywords: differential games, hierarchical control, simulation modeling, compulsion, impulsion, Stackelberg equilibrium.

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ABOUT ONE SPECIAL RIEMANN-HILBERT PROBLEM AND ITS APPLICATION

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A series of results related to the membrane theory of convex shells with piecewise smooth boundary of its middle surface are obtained. Its further development leads to the necessity of such formulation of a boundary problem, which would take into account the specificity of the stress equilibrium provided the concentration of stresses at corner points. Such a formulation is given for the shell with middle surface connected with the use of special boundary conditions of the Riemann-Hilbert problem, which allows to give a transparent geometric interpretation of the stress state of equilibrium provided the concentration of stresses at corner points, and also "to compare" the different states of equilibrium. This approach allows to formulate a criterion for the quasicorrectness of the task. The class of shells for which the task is quasicorrect has been allocated.

Keywords: convex shell, Riemann-Hilbert boundary value problem, index of the boundary value condition.

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MODELING OF CONTACT INTERACTION FOR DISC BREAKES ELEMENTS

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The calculation of temperature field for tribo-system “breaking disc - pad” is performed. For the corresponding calculations the finite element method was used with the application of modern software. An influence of size for channels of braking disc on braking moment and heating rate of system is analyzed. Some requirements for the process of development of braking disc construction are advised.

Keywords: thermoelasticity, frictional heating, contact problem, breaking system.

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