# MATHEMATICS

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## ON A RIEMANN PROBLEM FOR POLYANALYTIC FUNCTIONS IN A WEIGHTED SPACE OF CONTINUOUS FUNCTIONS

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*Babayan Vazgen Armenakovich – Post-Graduate Student, Faculty of Mathematics, Mechanics and Computer Sciences, Southern Federal University, Mil'chakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: bvazgen@gmail.com.*

*In the paper Riemann problem for polyanalytic functions in a weighted space of continuous functions is considered. The number of linearly independent solutions of homogeneous problem is obtained in explicit form. In the cases of integer and non-integer order that number differs by $n$ – the equation order. Necessary and sufficient conditions for solvability of inhomogeneous problem are obtained. Solutions are written in explicit form.*

***Keywords:*** *Riemann problem, weighted space, boundary value problem, polyanalytic functions, weighted continuous functions, Cauchy type integral.*

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## SIGNAL FILTERING WITH JUMPS. FINITE HORIZON, DISCRETE TIME

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*Beliavsky Grigory Isaakovich – Doctor of Technical Science, Professor, Head of Department of the Higher Mathematics and Operation Research, Faculty of the Mathematics, Mechanics and Computer Sciences, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: beliavsky@hotmail.com.*

*Misyura Ilya Vladimirovich – Post-Graduate Student, Department of the Higher Mathematics and Operation Research, Faculty of the Mathematics, Mechanics and Computer Sciences, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia.*

*The algorithms to prognosis of time series are important part of the information systems software. There are many references on design of different linear filters, and smaller degree the literature on design of the nonlinear filters is presented. At the same time nonlinear filters allow to avoid effect of smoothing. It is even less then the works connected with realization of nonlinear filters in the form of neural networks are rare in reference. The design neural networks prognosis with wavelet kernel for signals under model with stochastic volatility is considered in article.*

***Keywords:*** *neural networks, learning of neural networks, wavelet kernel, local volatility, quantile.*

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# STABILITY OF CORE-LIKE SOLUTIONS OF COOPERATIVE GAME IN CHARACTERISTIC FUNCTION FORM

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*Zinchenko Alexandra Borisovna – Candidate of Physical and Mathematical Science, Associate Professor, Department of the Higher Mathematics and Operation Research, Faculty of Mathematicians, Mechanics and Computer Sciences, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: zinch46@mail.ru.*

*The cooperative transferable utility games (TU games) and games with integer side payments (discrete) are considered. Set-valued solution of such games is stable if it consists of undominated imputations, but dominates all other imputations. It is proved the stability (with respect to standard domination relation) of D-core of discrete game with convex characteristic function. The subclass of 1- convex TU games with stable core is described. It is shown that the symmetric core of any TU game contains the Lorenz solution and Lorenz dominates all other core allocations.*

***Keywords:*** *cooperative TU game, discrete game, C-core, D-core, symmetric core, stability.*

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# GERMEYER'S GAMES AT MOTIVATION IN A THREE-LEVEL CONTROL SYSTEM OF THE SHIP'S WATER BALLAST

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*Ryzhkin Arthur Igorevich – Post-Graduate Student, Department of the Applied Mathematics and Programming, Faculty of the Mathematics, Mechanics and Computer Sciences, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: veronik@aaanet.ru.*

*Usov Anatoliy Borisovich – Doctor of the Technical Science, Professor, Department of the Applied Mathematics and Programming, Faculty of the Mathematics, Mechanics and Computer Sciences, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: usov@math.sfedu.ru.*

*The static three-level game-theoretic model of three-level control system of the ship's water ballast is built. The methods of hierarchical control in view of requirements of keeping the system in the given state are used. A comparison of the results of study of the model in terms of* $\Gamma_1$ *and* $\Gamma_2$ *Germeyer's games is conducted. Numerical calculations for some typical cases are given.*

***Keywords:*** *hierarchical control system, water ballast, compulsion, Germeyer´s games, imitation.*

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# CONDITIONS OF FLUID SEPARATION IN TRANSLATIONAL-ROTATIONAL ACCELERATION OF FLOATING ELLIPTICAL CYLINDER

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*Yakovenko Anton Aleksandrovich – Post-Graduate Student, Department of Mathematics, Mechanics and Computer Science, Southern Federal University, Milchakov St., 8a, Rostov-on-Don, 344090, Russia, e-mail: anton.sfedu12@mail.ru.*

*A nonlinear transient problem on the joint motion of an ideal fluid and fully submerged elliptical cylinder at small times is considered. It is assumed that the cylinder moves from a quiescent state in a horizontal translational direction at a constant acceleration, and rotates around its own axis with a constant angular acceleration. The peculiarity of this problem is that the high acceleration of the cylinder having a low pressure area near the body and form a cavity. The author defines the exact conditions of the separation of fluid particles from the surface of the moving body.*

***Keywords:*** *ideal incompressible fluid, elliptic cylinder, small times, Frud number, cavitation number, fluid separation.*

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