

ABSTRACTS

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ASYMPTOTIC BEHAVIOUR OF THE VARIOGRAMM IN THE ZERO

Abstract. It is known, that the second derivative of covariance function at distance zero plays the great role in topology and geometry of stationary random fields. Proceeding from the external information about stochastic function realization, a question of its account occurs in applied sciences, in particular, by specifying its power-mode behavior in zero. In the given work the model is offered providing the specified asymptotic behavior.

Keywords: geostochastic modelling, the spectral theory of stationary random fields, Euler characteristic, fractal. dimension

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THE TEST: DOES THE INPUT FLOW INTENSITY GROW IN QUEUEING SYSTEM?

Abstract. The mathematical model of queueing system with Poisson time moments of inputs is considered. Practically, it's actual (e.g. in the banking and insurance industry) to know the answer on the following question: Does the input flow intensity grow on a certain time interval? In this article the tests for this statistical hypothesis is proposed and their asymptotic properties is examed.

Keywords: queueing system, Poisson flow, input flow intensity, likelihood ratio test, least squares method, hypothesis of Poisson flow homogeneity.

R.A. Baladai, B.N. Khabibullin

THREE EQUIVALENT CONJECTURES ON AN ESTIMATE OF INTEGRALS

Abstract. We offer a conjecture on sharp estimation of a definite improper integral depend on a parameter $\lambda \in (0, +\infty)$ by means of given estimate of other definite integral depend on parameters $t \in [0, +\infty)$ and λ . Such sharp estimate is proved for $\lambda \leq 1$. Besides, an estimate is obtained for $\lambda > 1$. The last estimate is not exact seemingly. We give also two conjectures that are equivalent to the original conjecture. Sources of our conjectures are extremal problems for entire, meromorphic, and plurisubharmonic functions of several variables.

Keywords: improper integral, estimate, inequality, entire function, meromorphic function, plurisubharmonic function, Paley problem.

A.M. Gaisin, Zh.G. Rakhmatullina

BEHAVIOUR OF THE MINIMUM OF THE MODULUS OF THE DIRICHLET SERIES ON THE SYSTEM OF SEGMENTS

Abstract. We consider the problem of asymptotic equivalence of the logarithms of the least upper bound of the modulus of the entire Dirichlet series' sum on vertical line and its minimum of the modulus. In general case we take the minimum of the modulus on some compact that in certain sense is closely approximated by vertical segment of fixed length.

The required relation takes place everywhere on the positive ray probably except the set of the finite measure under optimal restrictions on the sequence of indexes of the series established in this paper.

Keywords: Dirichlet series, minimum of the modulus.

V.I. Lutsenko, R.S. Yulmukhametov

ON THE ACCURACY OF THE ASYMPTOTIC APPROXIMATION OF SUBHARMONIC FUNCTIONS OF THE LOGARITHM OF THE MODULUS OF AN ENTIRE FUNCTION

Abstract. We study the degree of possible accuracy of the asymptotic approximation of subharmonic functions of the logarithm of the modulus of an entire function. It is proved that if the subharmonic function u is twice differentiable and satisfies the condition

$$m \leq |z|\Delta u(z) \leq M, \quad |z| > 0,$$

where $M, m > 0$, then approximation with accuracy $q \ln |z| + O(1)$ with constant $q \in (0, \frac{1}{4})$ possible only outside sets of non- C_0 -set. On the other hand, it is shown that the approximation accuracy $q \ln |z| + O(1)$ with constant $q \geq \frac{1}{4}$ possible outside sets, allowing coverage circles $B(z_k, r_k)$ so that

$$\sum_{|z_k| \leq R} r_k = O(R^{\frac{3}{4}-q})$$

when $q \in [\frac{1}{4}, \frac{3}{4}]$ and

$$\sum_{|z_k| \geq R} r_k = O(R^{\frac{3}{4}-q})$$

when $q > \frac{3}{4}$. In particular, these sets are C_0 -sets when $q > \frac{1}{4}$. In the second case, the approximating function is the same for all $q \geq \frac{1}{4}$, and this function is only a small modification of functions of sine type, built Yu. Lubarsky and M. Sodin.

Keywords: subharmonic functions, entire functions.

I.Kh. Musin, S.V. Popënov

ON A WEIGHTED SPACE OF INFINITELY DIFFERENTIABLE FUNCTIONS IN \mathbb{R}^n

Abstract. It is studied the weighted space of infinitely differentiable functions in \mathbb{R}^n constructed with the use of a family φ of weight convex functions in \mathbb{R}^n which have fast growth dominating any linear function. It is proved that the closure of linear span of all polynomials is dense. It is obtained the description of strong dual space in terms of the Laplace transformation.

Keywords: approximation by polynomials, the Fourier-Laplace transform of functionals, entire functions, Paley-Wiener type theorem.

M.D. Ramazanov

NEW ALGORITHM OF ASYMPTOTICALLY OPTIMAL LATTICE CUBATURE FORMULAS

Abstract. Lattice cubature formulas are used to approximate computation of integrals of smooth functions of several variables $\int_{\Omega} f(x)dx$, by linear combinations

$h^n \sum_{\substack{k \in \mathbb{Z}^n, \\ hk \in \Omega}} c_k f(hk)$. Asymptotically optimal formula on W_2^m -space is defined by

$$\sup_{f \in W_2^m(\Omega)} \left| \int_{\Omega} f(x)dx - h^n \sum_{hk \in \Omega} c_k^{as} f(hk) \right| /$$

$$\inf_{\{c_k\}} \sup_{f \in W_2^m(\Omega)} \left| \int_{\Omega} f(x)dx - h^n \sum_{hk \in \Omega} c_k f(hk) \right| = 1.$$

Babenko proposed the concept of unsaturated computational algorithms [7] — preserving of optimal orders of convergence for all spaces of functions that are the parameters of the problem.

The paper describes a new algorithm for constructing the lattice cubature formulas, unsaturated not only by order, but also by the property of asymptotic optimality on W_2^m -spaces, $m \in (n/2, \infty)$.

Keywords: cubature formulas, optimization, nonsaturated algorithm

A.A. Rumyantseva

ASYMPTOTIC OF δ -SUBHARMONIC FUNCTIONS AND THEIR ASSOCIATED MEASURES

Abstract. It is studied the question of the relationship asymptoticheskogo behavior difference of two subharmonic functions $u_1 - u_2$ in a neighborhood of infinity and the difference of their associated measures $\mu_1 - \mu_2$. The asymptotic behavior of the difference is considered outside the exceptional sets of "power" is smallness, namely, outside the set, which for any γ permit coverage by the circle $B(z_j, r_j)$, such that

$$\sum_{R/2 \leq |z_j| \leq R} r_j = o(R^{\gamma+1}), \quad R \longrightarrow \infty.$$

Asymptotics of the difference associated measures is characterized by the behavior of the function

$$\max_{R \leq |z|/2} \left| \int_0^R \frac{\mu_1(z, t) - \mu_2(z, t)}{t} dt \right|$$

at infinity. Shown, for example, that this function behaves like $o(|z|^\sigma)$, if the difference $|u_1(z) - u_2(z)|$ outside an exceptional set of "power" smallness behaves like $o(|z|^\sigma)$. If $\sigma \notin \mathbb{N}$, then converse is also true.

Keywords: subharmonic functions, associated measure, Jensen formula, harmonic functions, Riesz representation.

A.A. Talyshv

ABOUT SYMMETRIES OF ISOBARIC MOTIONS GAZ

Annotation. The paper examines the utility of calculating Lie symmetries for non-involutive systems of differential equations. For example, group symmetries for system equations of isobaric motions gas will widen after the system is brought into an involutive form.

Keywords: Lie symmetries, involutive systems.

S.V. Khabirov

PLANE GAS MOTIONS WITH THE LINEAR FIELD OF THE VELOCITY WITHOUT DIVERGENCE

Annotation. We consider solutions of the gasdynamic equations with the linear field of the velocity without divergence as a differentially invariant submodel. The submodel from ordinary differential equations with one finite overdetermining correlation is obtained in Lagrange representation. All solutions of this submodel are found in the plane case.

Keywords: gas dynamics, differential-invariant solution, linear field of velocity.