International scientific conference

“Algebraic and Geometric Methods of Analysis”

Book of abstracts

May 28 - June 3, 2019

Odesa, Ukraine

Conference webpage: *imath.kiev.ua/~topology/conf/agma2019/*

List of topics

- Algebraic methods in geometry
- Differential geometry in the large
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
- History and methodology of teaching in mathematics

Organizers

- The Ministry of Education and Science of Ukraine
- Odesa National Academy of Food Technologies
- The Institute of Mathematics of the National Academy of Sciences of Ukraine
- Odessa I. I. Mechnikov National University
- Taras Shevchenko National University of Kyiv
- The International Geometry Center

Program Committee

Chairman: Prishlyak A.
(*Kyiv, Ukraine*)
Balan V.
(*Bucharest, Romania*)
Banakh T.
(*Lviv, Ukraine*)
Fedchenko Yu.
(*Odesa, Ukraine*)
Fomenko A.
(*Moscow, Russia*)
Fomenko V.
(*Taganrog, Russia*)
Haddad M.
(*Wadi al-Nasara, Syria*)
Karlova O.
(*Chernivtsi, Ukraine*)
Kiosak V.
(*Odessa, Ukraine*)
Kirillov V.
(*Odesa, Ukraine*)
Konovenko N.
(*Odesa, Ukraine*)
Lyubashenko V.
(*Kyiv, Ukraine*)
Maksymenko S.
(*Kyiv, Ukraine*)
Matsumoto K.
(*Yamagata, Japan*)
Mikesh J.
(*Olomouc, Czech Republic*)
Mormul P.
(*Warsaw, Poland*)
Moskaliuk S.
(*Wien, Austria*)
Mykhailyuik V.
(*Chernivtsi, Ukraine*)
Nykyforchyn O.
(*Ivano-Frankivsk, Ukraine*)
Plachta L.
(*Krakov, Poland*)
Pokas S.
(*Odesa, Ukraine*)
Polulyakh E.
(*Kyiv, Ukraine*)
Sabitov I.
(*Moscow, Russia*)
Savchenko A.
(*Kherson, Ukraine*)
Sergeeva A.
(*Odesa, Ukraine*)
Shvets V.
(*Odesa, Ukraine*)
Shelekhov A.
(*Tver, Russia*)
Vlasenko I.
(*Kyiv, Ukraine*)
Volkov V.
(*Odessa, Ukraine*)
Zadorozhnyj V.
(*Odesa, Ukraine*)
Zarichnyi M.
(*Lviv, Ukraine*)

НТБ ОНАХТ

Administrative committee

- Egorov B., chairman, rector of the ONAFT;
- Povarova N., deputy chairman, Pro-rector for scientific work of the ONAFT;
- Mardar M., Pro-rector for scientific-pedagogical work and international communications of the ONAFT;
- Fedosov S., Director of the International Cooperation Center of the ONAFT;
- Svytyy I., Dean of the Faculty of Computer Systems and Automation.

Organizing commitee

Kirillov V.
Konovenko N.
Fedchenko Yu.
Prus A.
Osadchuk E.
Maksymenko S.
Khudenko N.
Cherevko E.

НТБ ОНАХТ

On a regularized solution of the Cauchy problem for matrix factorizations of the Helmholtz equation in $m-$dimensional bounded domain

Juraev D.A.
(Karshi State University, Karshi city, Uzbekistan)
E-mail: juraev_davron@list.ru

In the paper it is considered the problem of regularization of the Cauchy problem for matrix factorisations of the Helmholtz equation in $m-$dimensional bounded domain of the type of a curvilinear triangle. Using the results of works [1]-[2], is constructed explicitly Carleman matrix and, based on the regularized solution of the Cauchy problem.

Let $\mathbb{R}^m$ be a $m-$dimensional real Euclidean space,

$$x = (x_1, \dots, x_m) \in \mathbb{R}^m, \;\; y = (y_1, \dots, y_m) \in \mathbb{R}^m.$$

Let $G_\rho \subset \mathbb{R}^m$ be a bounded simply connected domain whose boundary consists of the surface of a cone

$$\left|y'\right| = \tau y_m, \;\; \tau = tg\frac{\pi}{2\rho}, \;\; y_m > 0, \;\; \rho > 1,$$

and a smooth piece of the surface S lying inside the cone, i.e. $\partial G_\rho = S \bigcup T, \;\; T = \partial G_\rho \backslash S$.

We consider in the domain G_ρ a system of differential equations

$$D\left(\frac{\partial}{\partial x}\right) U(x) = 0, \tag{1}$$

where $D\left(\frac{\partial}{\partial x}\right)$ is the matrix of differential operators is of the first order.

We denote by $A(G_\rho)$ the class of vector functions in the domain G, of continuous on $\overline{G}_\rho = G_\rho \bigcup \partial G_\rho$ and satisfying system (1).

Problem 1. Let $U(y) \in A(G_\rho)$ and

$$U(y)|_S = f(y), \;\; y \in S. \tag{2}$$

Here, $f(y)$ is a given continuous vector function on S.

It is required to restore the vector function $U(y)$ in the domain G_ρ, based on its values $f(y)$ on S.

Theorem 2. *Let $U(y) \in A(G_\rho)$ on the entire boundary of ∂G_ρ satisfy the boundary condition*

$$|U(y)| \leq 1, \;\; y \in T.$$

Then we have the estimate

$$\left|U(x) - U_{\sigma(\delta)}(x)\right| \leq C_\rho(\lambda, x)\sigma\delta^{\left(\frac{\gamma}{R}\right)^\rho}, \;\; \sigma > 1, \;\; x \in G_\rho.$$

Corollary 3. *The limiting equality*

$$\lim_{\delta \to 0} U_{\sigma(\delta)}(x) = U(x),$$

holds uniformly on each compact set in the domain G_ρ.

Thus, the functional $U_{\sigma(\delta)}(x)$ determines the regularization of the solution of problem (1)-(2).

НТБ ОНАХТ

References

[1] Juraev D.A. On the Cauchy problem for matrix factorizations of the Helmholtz equation in a bounded domain. *Sib. Electron. Mat. Izv.*, 15 : 11–20, 2018.

[2] Juraev D.A. On a regularized solution of the Cauchy problem for matrix factorizations of the Helmholtz equation. *Advanced Mathematical Models & Applications*, 4(1) : 86–96, 2019.

НТБ ОНАХТ

Зміст

Absamatov Z.A. *Formation of algorithmic culture of students in the classroom of higher mathematics* **3**

Absamatov Z. A., Khamrayev A. Yu. *Behavior of the trajectories of a single cubic operator* **4**

Banaru G. A. *On nonexistence of Kenmotsu structure on Kirichenko–Uskorev-hypersurfaces of Kählerian manifolds* **5**

Banaru M. B. *On almost contact metric hypersurfaces in W_4-manifolds* **7**

Batkhin A. B. *Quantum calculus and singularities of quasi-discriminant sets* **9**

Bernatska J. *Derivative Thomae formula for singular half-periods* **11**

Bilet V., Dovgoshey O. *Kuratowski limits of subsets of real line and their applications to pretangent spaces* **13**

Bonacci E. *Algebraic and geometric questions about a FTL physics* **15**

Bruno A. D. *Algorithms for solving an algebraic equation* **16**

Dryuma V. S. *Around the homologous sphere of Poincare and its applications* **17**

Eftekharinasab K. *On the generalization of the Darboux theorems* **19**

Favorov S. *Discrete sets, discrete measures, quasicrystals Fourier, pure crystals* **20**

Glazunov N. *Algebraic-geometric aspects of function field analogues to abelian varieties* **21**

Gok O. *Extensions of almost orthosymmetric lattice bimorphisms* **23**

Grechneva M., Stegantseva P. *The properties of the surface of Minkowski space, which determine the type of its Grassmann image* **24**

Gutik O., Melnyk K. *The semigroup of star partial homeomorphisms of a finite deminsional Euclidean space* **25**

Gutik O., Sobol O. *Extensions of semigroups by symmetric inverse semigroups of a bounded finite rank* **26**

Prishlyak A., Hatamian H. *Non-Oriented Heegaard Diagrams* **28**

Herasymov V., Gefter S., Arinenkov A. *Some many-dimensional extremal geometric problems* **30**

Juraev D. A. *On a regularized solution of the Cauchy problem for matrix factorizations of the Helmholtz equation in $m-$dimensional bounded domain* **31**

Kozerenko S. *Neighborhood maps on combinatorial trees and their Markov graphs* **33**

Kuznietsova I., Soroka Yu. *First Betti numbers of orbits of Morse functions on surfaces* **34**

Maksymenko S., Khohliyk O. *Diffeomorphisms preserving Morse-Bott foliations* **35**

Markitan V. *Singular monotonic functions defined by a convergent positive series and a double stochastic matrix* **36**

Matsumoto K. *A Flat $(CHR)_3$-curvature tensor in a Trans-Sasakian Manifold* **38**

НТБОНАХТ