

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

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 COMMITTEE

Kirillov V.
Konovenko N.
Fedchenko Yu.

Prus A.
Osadchuk E.

Maksymenko S.
Khudenko N.
Cherevko E.

ФІТБ ОНАФТ

On the generalization of the Darboux theorems

Kaveh Eftekharinasab

(Institute of mathematics of NAS of Ukraine)

E-mail: kaveh@imath.kiev.ua

We refer to [1] for the definitions concerning the category of MC^k -Fréchet manifolds.

We prove that vector fields have local flows.

Theorem 1. *Let F be a Fréchet space, X an MC^k -vector field on $U \subset F$, $k \geq 1$. There exists a real number $\alpha > 0$ such that for each $x \in U$ there exists a unique integral curve $\ell_x(t)$ satisfying $\ell_x(0) = x$ for all $t \in I = (-\alpha, \alpha)$. Furthermore, the mapping $\mathbb{F} : I \times U \rightarrow F$ given by $\mathbb{F}_t(x) = \mathbb{F}(t, x) = \ell_x(t)$ is of class MC^k .*

Therefore we are able to apply Moser's approach, that is constructing an appropriate isotopy generated by a time dependent vector field that provides the chart transforming of symplectic forms to constant ones to prove the Darboux theorem in the category of MC^k -manifolds.

Definition 2. Let M be a bounded Fréchet manifold. We say that M is weakly symplectic if there exists a closed smooth 2-form ω such that it is weakly non-degenerate i.e. for all $x \in M$ and $v_x \in T_x M$

$$\omega_x(v_x, w_x) = 0 \tag{1}$$

for all $w_x \in T_x M$ implies $v_x = 0$.

Let F'_b be the strong dual of F and define the map $\omega_x^\# : F \rightarrow F'_b$ by

$$\langle w, \omega_x^\#(v) \rangle = \omega_x(w, v),$$

where $\langle \cdot, \cdot \rangle$ is a duality pairing. Condition 1 implies that $\omega^\#$ is injective.

Let $x \in U$ be fixed and define $H_x = \{\omega_x(y, \cdot) \mid y \in F\}$, this is a subset of F'_b and its topology is induced from it. We assume that all Fréchet spaces are reflexive.

Lemma 3. $\omega_x^\# : F \rightarrow H_x$ is an isomorphism.

Theorem 4. *Let (M, ω) be a weakly symplectic smooth bounded Fréchet manifold modeled on F . Let $\omega^t = \omega_0 + t(\omega - \omega_0)$ for $t \in [0, 1]$. Suppose that following hold*

- (1) *There exists an open star-shaped neighborhood \mathcal{U} of zero such that for all $x \in \mathcal{U}$ the map $\omega_x^{t\#} : F \rightarrow H_x$ is isomorphism for each t ,*
- (2) *for $x \in \mathcal{U}$ the map $(\omega_x^{t\#})^{-1} : H_x \rightarrow F$ is smooth for each t .*

Then there exists a coordinate chart (\mathcal{V}, φ) around zero such that $\varphi^\omega = \omega_0$.*

REFERENCES

- [1] Kaveh Eftekharinasab. Geometry of bounded Fréchet manifolds, *Rocky Mountain Journal of Mathematics*, 46(3) : 895–913, 2016.

Зміст

Absamatov Z.A. <i>Formation of algorithmic culture of students in the classroom of higher mathematics</i>	3
Absamatov Z. A., Khamrayev A. Yu. <i>Behavior of the trajectories of a single cubic operator</i>	4
Banaru G. A. <i>On nonexistence of Kenmotsu structure on Kirichenko–Uskorev-hypersurfaces of Kählerian manifolds</i>	5
Banaru M. B. <i>On almost contact metric hypersurfaces in W_4-manifolds</i>	7
Batkhin A. B. <i>Quantum calculus and singularities of quasi-discriminant sets</i>	9
Bernatska J. <i>Derivative Thomae formula for singular half-periods</i>	11
Bilet V., Dovgoshey O. <i>Kuratowski limits of subsets of real line and their applications to pretangent spaces</i>	13
Bonacci E. <i>Algebraic and geometric questions about a FTL physics</i>	15
Bruno A. D. <i>Algorithms for solving an algebraic equation</i>	16
Dryuma V. S. <i>Around the homologous sphere of Poincare and its applications</i>	17
Eftekharinasab K. <i>On the generalization of the Darboux theorems</i>	19
Favorov S. <i>Discrete sets, discrete measures, quasicrystals Fourier, pure crystals</i>	20
Glazunov N. <i>Algebraic-geometric aspects of function field analogues to abelian varieties</i>	21
Gok O. <i>Extensions of almost orthosymmetric lattice bimorphisms</i>	23
Grechneva M., Stegantseva P. <i>The properties of the surface of Minkowski space, which determine the type of its Grassmann image</i>	24
Gutik O., Melnyk K. <i>The semigroup of star partial homeomorphisms of a finite deminsional Euclidean space</i>	25
Gutik O., Sobol O. <i>Extensions of semigroups by symmetric inverse semigroups of a bounded finite rank</i>	26
Prishlyak A., Hatamian H. <i>Non-Oriented Heegaard Diagrams</i>	28
Herasymov V., Gefter S., Arinenkov A. <i>Some many-dimensional extremal geometric problems</i>	30
Juraev D. A. <i>On a regularized solution of the Cauchy problem for matrix factorizations of the Helmholtz equation in m-dimensional bounded domain</i>	31
Kozerenko S. <i>Neighborhood maps on combinatorial trees and their Markov graphs</i>	33
Kuznietsova I., Soroka Yu. <i>First Betti numbers of orbits of Morse functions on surfaces</i>	34
Maksymenko S., Khohliyk O. <i>Diffeomorphisms preserving Morse-Bott foliations</i>	35
Markitan V. <i>Singular monotonic functions defined by a convergent positive series and a double stochastic matrix</i>	36
Matsumoto K. <i>A Flat $(CHR)_3$-curvature tensor in a Trans-Sasakian Manifold</i>	38