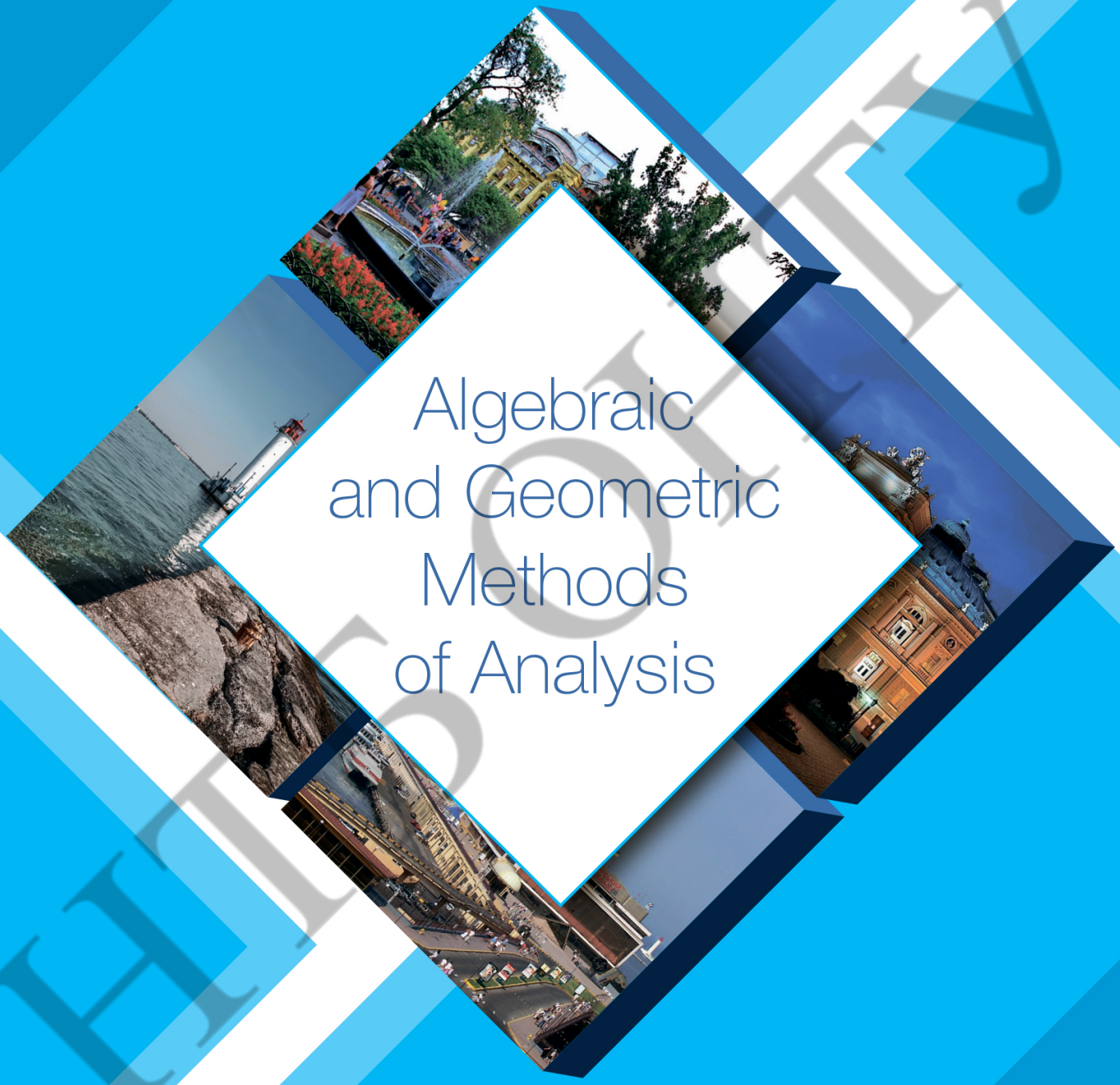
International
Scientific Conference



Algebraic and Geometric Methods of Analysis

27-30 May 2024
Odesa, Ukraine

The purpose of this conference is to bring together researchers in geometry, topology, algebra, analysis and dynamical systems and to provide for them a forum to present their recent work to colleagues from different nationalities. This way we aim to stimulate discussion about the latest findings in geometrical and topological methods in analysis and to increase international collaboration.

The conference continues the traditional annual conference «Geometry in Odesa» holding from 2004, and hosted by Odesa National University of Technology (Odesa National Academy of Food Technologies till 2021). From 2017 the conference was renamed to «Algebraic and geometric methods of analysis» (AGMA).

The Conference languages: Ukrainian and English.

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 and topological methods in natural sciences
- Geometric problems in mathematical analysis

Organizers

- Ministry of Education and Science of Ukraine
- Odesa National University of Technology, Ukraine
- Institute of Mathematics of the National Academy of Sciences of Ukraine
- Taras Shevchenko National University of Kyiv
- Kyiv Mathematical Society

Scientific Committee

- **Vladimir Balan** (*Bucharest, Romania*)
- **Taras Banakh** (*Lviv, Ukraine*)
- **Dmytro Bolotov** (*Kharkiv, Ukraine*)
- **Vyacheslav Boyko** (*Kyiv, Ukraine*)
- **Yulia Fedchenko** (*Odesa, Ukraine*)
- **Oleg Gutik** (*Lviv, Ukraine*)
- **Olena Karlova** (*Chernivtsi, Ukraine*)
- **Volodymyr Kiosak** (*Odesa, Ukraine*)
- **Nadiia Konovenko** (*Odesa, Ukraine*)
- **Volodymyr Lyubashenko** (*Kyiv, Ukraine*)
- **Sergiy Maksymenko** (*Kyiv, Ukraine*)
- **Koji Matsumoto** (*Yamagata, Japan*)
- **Piotr Mormul** (*Warsaw, Poland*)
- **Maryna Nesterenko** (*Kyiv, Ukraine*)
- **Roman Popovych** (*Kyiv, Ukraine*)
- **Alexandr Prishlyak** (*Kyiv, Ukraine*)
- **Aleksandr Savchenko** (*Kherson, Ukraine*)

Organizing commitee

- **Nadiia Konovenko** (*Odesa, Ukraine*)
- **Yuliya Fedchenko** (*Odesa, Ukraine*)
- **Mykola Lysynskiy** (*Kyiv, Ukraine*)
- **Bohdan Mazhar** (*Kyiv, Ukraine*)
- **Sergiy Maksymenko** (*Kyiv, Ukraine*)
- **Alexandr Prishlyak** (*Kyiv, Ukraine*)

(iii) An equation of the form (3) *admits the conservation-law characteristic* u_{xx} *or* u_{yy} *if and only if* $a = b = 0$ *or* $a = c = 0$*, respectively.*

Theorem 6. *An* r*th order* ($r \in \{1, 2, 3\}$) *partial differential equation with three independent variables admits the algebra* $\mathfrak{g}$ *as its Lie invariance algebra and the conservation-law characteristics* 1*,* u_{xx} *and* u_{yy} *if and only if it coincides with the dispersionless Nizhnik equation* (1)*.*

The presented properties of the equation (1) are used in [4] to construct its exact solutions.

References

[1] Boyko V.M., Popovych R.O. and Vinnichenko O.O. Point- and contact-symmetry pseudogroups of dispersionless Nizhnik equation. *Commun. Nonlinear Sci. Numer. Simul.*, 132 : 107915, 2024, arXiv:2211.09759.

[2] Maltseva D.S. and Popovych R.O. Complete point-symmetry group, Lie reductions and exact solutions of Boiti–Leon–Pempinelli system. *Phys. D*, 460 : 134081, 2024, arXiv:2103.08734.

[3] Nizhnik L.P. Integration of multidimensional nonlinear equations by the inverse problem method. *Soviet Phys. Dokl.*, 25 : 706–708, 1980.

[4] Vinnichenko O.O., Boyko V.M. and Popovych R.O. Lie reductions and exact solutions of dispersionless Nizhnik equation. *Anal. Math. Phys.*, to appear, 2024, arXiv:2308.03744.

Chain-regular and regular components of the wandering set of surface homeomprphisms

Igor Yu. Vlasenko
(Institute of mathematics, Kiev, Ukraine)
E-mail: vlasenko@imath.kiev.ua

Regular components of the wandering set of surface homeomorphisms were introduced by Birkgoff [1, 2]. With the emergence of the chain recurrent set theory introduced by Conley [3] for flows and adapted for discrete dynamical systems by Franks and Hurley [4, 5] we can define an analog of regular components of the wandering set for the set of chain-regular points (points that are not chain recurrent) as the set of points that divide an attractor-repeller pair.

We study the topology of chain-regular components of surface homeomorphisms and show that it is in fact different from the topology of regular components of the wandering set.

References

[1] G. Birkhoff. Dynamical systems. *Colloquium Publications. V. 9, AMS, Providence, RI*, 1927.

[2] G. Birkhoff, P. Smith. Structure analysis of surface transformations. *J. Math*, 7:357–369, 1928.

[3] Charles Conley. *Isolated invariant sets and the Morse index*, volume 38 of *CBMS Regional Conference Series in Mathematics*. American Mathematical Society, Providence, R.I., 1978.

[4] John Franks. *A variation on the Poincaré-Birkhoff theorem*, volume 81 of *Contemp. Math.*, pages 111–117. Amer. Math. Soc., Providence, RI, 1988.

[5] Mike Hurley. Chain recurrence, semiflows, and gradients. *J. Dynam. Differential Equations*, 7(3):437–456, 1995.