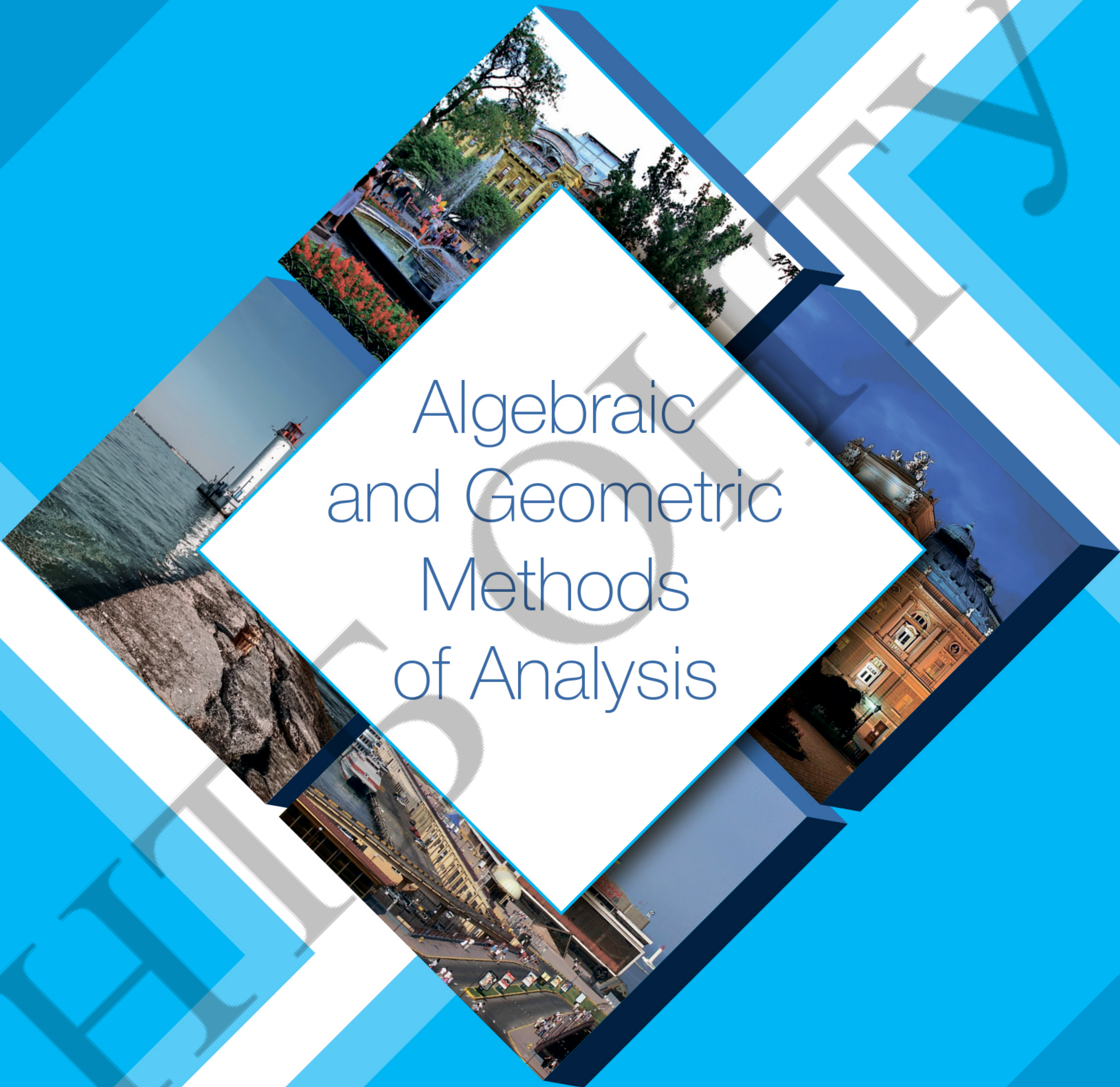
International
Scientific Conference



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

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Results on boundary behavior of quasiregular and harmonic mappings

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We discuss connections between different conditions involving conformal capacity densities, dilatations and multiplicities of the zeros, and boundary behavior of quasiconformal and related classes of mappings. We compare Caratheódory, Koebe and Lindelöf type results for these classes of mappings to the results from classical function theory as well as those concerning quasiconformal and quasiregular mappings in plane and n-dimensional Euclidean space.

Sufficient conditions for the existence of angular (non-tangential) limit at a boundary point can be obtained, for example, in terms of multiplicities of zeroes of the function, which are required grow fast enough on a given sequence of points approaching the boundary [1, 2, 3] Another condition makes use of makes of capacity density of a non-tangential set at the boundary [4]. We also discuss sharpness of such conditions. This presentation is based on joint work with Daoud Bshouty, Jiaolong Chen, Stavros Evdoridis, Jie Huang, and Matti Vuorinen.

References

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Einstein Solvmanifolds not based on Nilsolitons

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In this seminar, we describe different techniques to construct pseudo-Riemannian Einstein solvmanifolds, expanding beyond the traditional framework reliant on nilsolitons.

In the first part, we review Einstein solvmanifolds and their construction based on nilsolitons. We will recall the notion of pseudo-Iwasawa and the role of nice nilpotent Lie algebras. Subsequently, we present two different constructions of Einstein solvmanifolds that do not rely on nilsolitons and are peculiar to the indefinite case. The first construction uses contact symplectic reduction (a peculiar feature of pseudo-Sasaki geometry). The second, which is quite new, is based on solving the generalized nilsoliton equation and introduces a new methodology. Both constructions yield examples that are not isometric to any Einstein solvmanifold of pseudo-Iwasawa type.

We will also discuss related geometric structures, such as Sasaki, pseudo-Kähler, and para-Kähler geometries. Time permitting, we will explore open pathways for further research in differential geometry.

This talk is based on joint work with D. Conti and R. Segnan Dalmasso.

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Ricci flow of $G2$-type real flag manifolds

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A real flag manifold is a quotient space $\mathbb{F} = G/P$, where G is a connected Lie group with non-compact real simple associated Lie algebra $\mathfrak{g}$, and P is a parabolic subgroup of G. In [1], ee investigate homogeneous Riemannian geometry on real flag manifolds of the split real form of $\mathbf{g}_2$. We characterize the metrics that are invariant under the action of a maximal compact subgroup of G2 and we explore the Ricci flow for the case where the isotropy representation has no equivalent summands, employing techniques from the qualitative theory of dynamical systems. This is joint work with Brian Grajales and Gabriel Rondon.

References

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