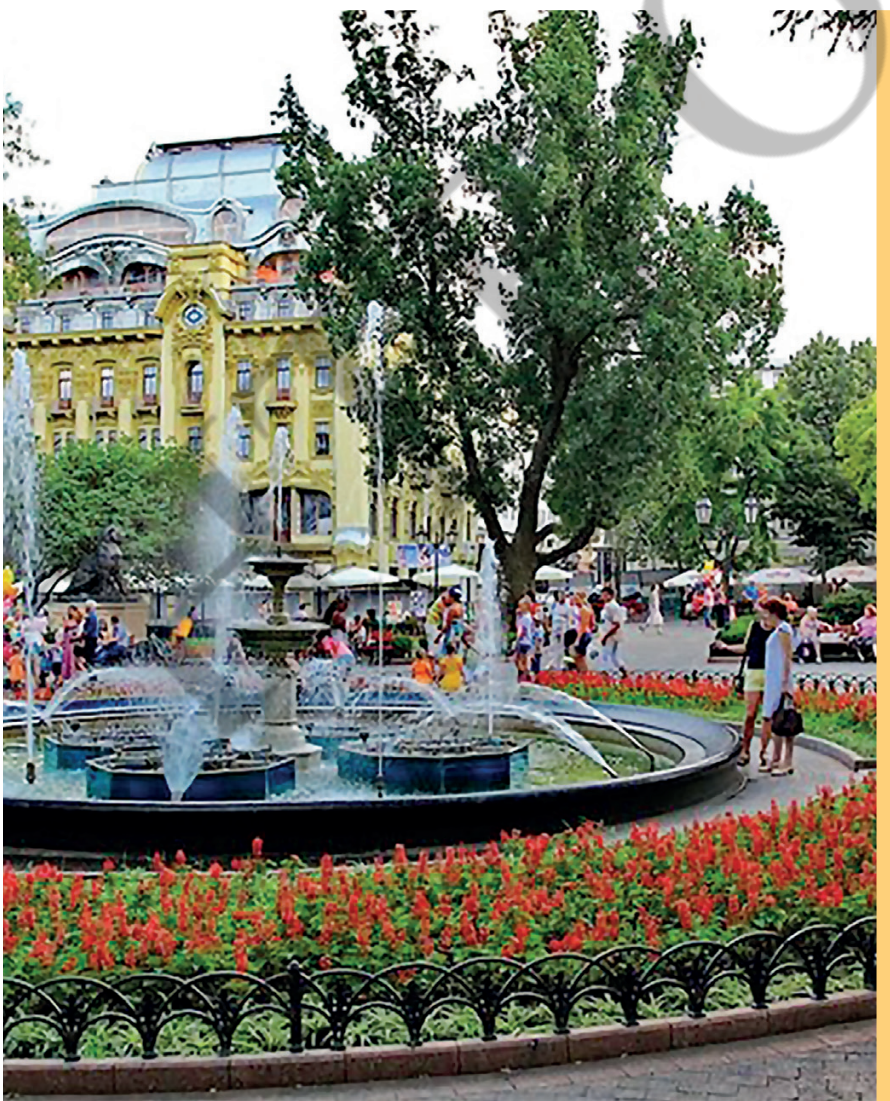
International
Scientific Conference

Algebraic and Geometric Methods of Analysis



Devoted to 160 anniversary of
Dvytro Grave
(25.08.1863 - 19.12.1939)
Academician of the Ukrainian Academy of Sciences, the first director of the Institute of Mathematics of NAS of Ukraine

May 29 – June 1, 2023
Odesa, Ukraine

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

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this yields a *Poincaré–Reeb graph*, which is naturally transversal to the foliation by vertical lines. We show that any transversal graph whose vertices have only valencies 1 and 3 and are situated on distinct vertical lines can be realized as a Poincaré–Reeb graph.

References

[1] Miruna-Stefana Sorea. The shapes of level curves of real polynomials near strict local minima. *Ph.D. thesis, Université de Lille/Laboratoire Paul Painlevé*, France, 2018

[2] Miruna-Stefana Sorea. Constructing separable Arnold snakes of Morse polynomials. *Portugaliae Mathematica. A Journal of the Portuguese Mathematical Society* 77 (2020), no. 2, 219–260.

[3] Miruna-Stefana Sorea. Measuring the local non-convexity of real algebraic curves. *Journal of Symbolic Computation* 109 (2022), 482–509.

[4] Miruna-Stefana Sorea. Permutations encoding the local shape of level curves of real polynomials via generic projections. *Annales de l'Institut Fourier (Grenoble)* 72 (2022), no. 4, 1661–1703.

[5] Arnaud Bodin, Patrick Popescu-Pampu, Miruna-Stefana Sorea. Poincaré-Reeb graphs of real algebraic domains. https://arxiv.org/abs/2207.06871 (to appear in *Revista Matemática Complutense*)

On univalent trinomials

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The Suffridge polynomials were introduced by T. Suffridge [1] and play an important role in complex analysis. Suffridge polynomials are closely related to the Brandt polynomials, first mentioned in M. Brandt's Ph.D. thesis [2] and rediscovered in [3].

The T-folded version of these polynomials were suggested in [4, 5] and several important conjectures about them were made.

In this talk we will outline the proof of these conjectures in the particular case of trinomials

$$z + az^{1+T} + bz^{1+2T}.$$

A beautiful geometry behind the scenes will be illuminated.

References

[1] T.J. Suffridge, On univalent polynomials, *J. London Math. Soc.* 44, 496–504, 1969.

[2] M. Brandt, Variationsmethoden für in der Einheitskreisscheibe schlichte Polynome, Th⊠esis, Humboldt-Univ. Berlin, 1987.

[3] D. Dmitrishin, A. Smorodin, and A. Stokolos, An extremal problem for polynomials, *Applied and Computational Harmonic Analysis*, 56: 283–305, 2022.

[4] D. Dmitrishin, D. Gray, and A. Stokolos, Some extremal problems for trinomials with fold symmetry, 12(4), *Analysis and Mathematical Physics*, 2022.

[5] D. Dmitrishin, D. Gray, and A. Stokolos, On the Koebe quarter theorem for trionomials with fold symmetry, *Proceedings of the AMS* (to appear).