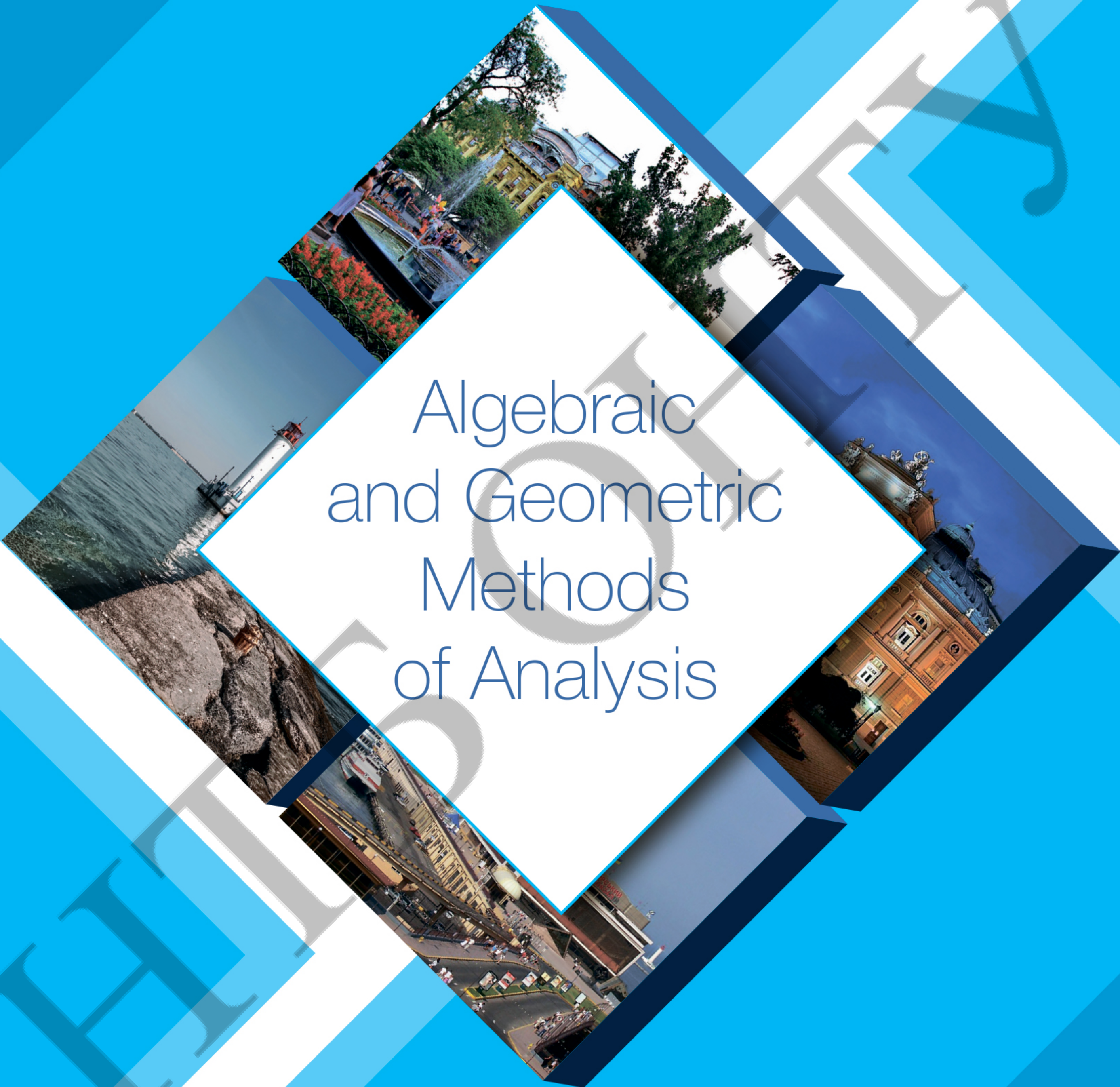
International
Scientific Conference



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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On the semigroup of non-injective monoid endomorphisms of some extension of the bicyclic monoid

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Let $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ be the semigroup defined in [1] with the two-element family $\mathscr{F}$ of inductive subset of ω. Without loss of generality we may assume that $\mathscr{F}=\{[0,\infty),[1,\infty)\}$.

In the paper [2] we study injective endomorphisms of the semigroup $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ with the two-elements family $\mathscr{F}$ of inductive nonempty subsets of ω. We describe the elements of the semigroup $\boldsymbol{End}_{*}^{1}(\boldsymbol{B}_{\omega}^{\mathscr{F}})$ of all injective monoid endomorphisms of the monoid $\boldsymbol{B}_{\omega}^{\mathscr{F}}$.

This work is a continuation of [2].

Fix an arbitrary non-negative integer k. For all $i,j\in\omega$ we define transformations γ_k and δ_k of the semigroup $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ in the following way

$$(i,j,[0,\infty))\gamma_k=(i,j,[1,\infty))\gamma_k=(ki,kj,[0,\infty)).$$

$$(i,j,[0,\infty))\delta_k=(ki,kj,[0,\infty)) \qquad \text{and}$$

$$(i,j,[1,\infty))\delta_k=(k(i+1),k(j+1),[0,\infty))$$

By $\boldsymbol{End}_{0}^{*}(\boldsymbol{B}_{\omega}^{\mathscr{F}})$ we denote the semigroup of all non-injective monoid endomorphisms of the monoid $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ for the family $\mathscr{F}=\{[0,\infty),[1,\infty)\}$.

Theorems 1 and 2 describe the algebraic structure of the semigroup $\boldsymbol{End}_{0}^{*}(\boldsymbol{B}_{\omega}^{\mathscr{F}})$.

Theorem 1. *If $\mathscr{F}=\{[0,\infty),[1,\infty)\}$, then for any non-injective monoid endomorphism $\mathfrak{e}$ of the monoid $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ only one of the following conditions holds:*

(1) $\mathfrak{e}$ is the annihilating endomorphism, i.e., $\mathfrak{e}=\gamma_0=\delta_0$;
(2) $\mathfrak{e}=\gamma_k$ for some positive integer k;
(3) $\mathfrak{e}=\delta_k$ for some positive integer k.

Theorem 2. *Let $\mathscr{F}=\{[0,\infty),[1,\infty)\}$. Then for all positive integers k_1 and k_2 the following conditions hold:*

(1) $\gamma_{k_1}\gamma_{k_2}=\gamma_{k_1k_2}$;
(2) $\gamma_{k_1}\delta_{k_2}=\gamma_{k_1k_2}$;
(3) $\delta_{k_1}\gamma_{k_2}=\delta_{k_1k_2}$;
(4) $\delta_{k_1}\delta_{k_2}=\delta_{k_1k_2}$.

References

[1] O. Gutik, M. Mykhalenych. On some generalization of the bicyclic monoi, Visnyk Lviv. Univ. Ser. Mech.–Mat., 90, 2020, p. 5–19 (in Ukrainian).

[2] O. Gutik, I. Pozdniakova. On the semigroup of injective monoid endomorphisms of the monoid $\boldsymbol{B}_{\omega}^{\mathscr{F}}$ with the two-elements family $\mathscr{F}$ of inductive nonempty subsets of ω, Visnyk L'viv. Univ. Ser. Mech.-Mat, 94, 2022, p. 32–55.