

International
Online Conference



**Algebraic
and Geometric
Methods of Analysis**

dedicate to the memory
of Yuriy Trokhymchuk
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Odesa, Ukraine

LIST OF TOPICS

- Topological methods in analysis
- Geometric problems of complex and mathematical analysis
- Algebraic methods in geometry
- Differential geometry in the whole
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Geometric and topological methods in natural sciences

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Monogenic functions with values in commutative complex algebras of the second rank with unity and generalized biharmonic equation with non-zero simple characteristics

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Among all two-dimensional algebras of the second rank with unity e over the field of complex numbers \mathbb{C} , we found a semi-simple algebra $\mathbb{B}_0 := \{c_1e + c_2\omega : c_k \in \mathbb{C}, k = 1, 2\}$, $\omega^2 = e$, containing bases $\{e_1, e_2\}$, such that \mathbb{B}_0 -valued “analytic” functions $\Phi(xe_1 + ye_2)$ (x, y are real variables) satisfy the fourth order homogeneous partial differential equation of the form:

$$\left(b_1 \frac{\partial^4}{\partial y^4} + b_2 \frac{\partial^4}{\partial x \partial y^3} + b_3 \frac{\partial^4}{\partial x^2 \partial y^2} + b_4 \frac{\partial^4}{\partial x^3 \partial y} + b_5 \frac{\partial^4}{\partial x^4} \right) u(x, y) = 0, \quad (1)$$

where complex coefficients $b_k \in \mathbb{C}$, $k = \overline{1, 5}$, $b_5 \neq 0$, such than the Eq. of characteristics

$$l(s) := b_1 s^4 + b_2 s^3 + b_3 s^2 + b_4 s + b_5 = 0, s \in \mathbb{C}, \quad (2)$$

has four pairwise different roots (each root is a simple root).

A set of pairs $(\{e_1, e_2\}, \Phi)$, where all real components of Φ satisfy Eq. 1, is described in the explicit form.

A totalities of “analytic” functions $\Phi(xe_1 + ye_2)$, such that the first real component of each of them satisfies the given solution u of Eq. 1 in the simply-connected bounded domains, are found in [2, 3, 5, 6].

Particular cases of this research are considered in [1, 2, 3, 4, 5].

The complete statements, proofs and definitions are considered in [6].

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