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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Vector bundle construction via monads on multiprojective spaces

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In this paper we construct indecomposable vector bundles associated to monads on multiprojective spaces. Specifically we establish the existence of monads on $\mathbf{P}^{2n+1} \times \mathbf{P}^{2n+1} \times \cdots \times \mathbf{P}^{2n+1}$ and on $\mathbf{P}^{a_1} \times \cdots \times \mathbf{P}^{a_n}$. We prove stability of the kernel bundle which is a dual of a generalized Schwarzenberger bundle associated to the monads on $X = \mathbf{P}^{2n+1} \times \mathbf{P}^{2n+1} \times \cdots \times \mathbf{P}^{2n+1}$ and prove that the cohomology vector bundle which is simple, a generalization of special instanton bundles. We also prove stability of the kernel bundle and that the cohomology vector bundle associated to the monad on $\mathbf{P}^{a_1} \times \cdots \times \mathbf{P}^{a_n}$ is simple. Lastly, we construct the morphisms that establish the existence of monads on $\mathbf{P}^1 \times \cdots \times \mathbf{P}^1$.

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About one problem of the Gauss-Kuzmin type

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Let $[a_0; a_1, ..., a_n, ...]$ — continued fraction, where $a_0 \in Z_+$, $a_j > 0$ for all $j \in N$. Consider left shift operator

$$T([0; a_1, a_2, ..., a_n, ...]) = [0; a_2, a_3, ..., a_{n+1}, ...].$$

Let $f_n(x) = \lambda(T^{-n}((0; x]))$, where $x \in (0; 1]$, $\lambda(\cdot)$ — Lebesgue measure. The problem of finding

$$f(x) = \lim_{n \to +\infty} f_n(x)$$

for classical continued fractions was posed by Gauss. Kuzmin [1] showed that $f(x) = \log_2(x+1)$ and

$$|f_n(x) - \log_2(1+x)| \leq C\beta^{(n^\eta)} \ \ \forall x \in (0; 1]$$

for $\eta = 0,5$ some $C > 0$ and $\beta \in (0; 1)$. Levy [2] showed that it is possible to take $\beta = 0,7$ and $\eta = 1$. Wirsing [4] showed that, for the constant $\gamma \approx 0,3037$

$$\psi(x) = \lim_{n \to +\infty} \frac{f_n(x) - \log_2(1+x)}{(-\gamma)^n} \ \ \forall x \in (0; 1],$$

where $\psi(x)$ — analytic function.

It is known [3] that for each $t \in [0,5; 1]$ there exists a sequence (b_n) such that $b_n \in \{0,5; 1\}$ for all $n \in N$ and $t = [0; b_1, ..., b_n, ...]$. The last image is called A_2-image. A countable set of numbers $t \in [0,5; 1]$ has two A_2-images.