

International
Online Conference



**Algebraic
and Geometric
Methods of Analysis**

dedicate to the memory
of Yuriy Trokhymchuk
(17.03.1928-18.12.2019)

May 25-28, 2021
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

ORGANIZERS

- Ministry of Education and Science of Ukraine
- Odesa National Academy of Food Technologies
- Institute of Mathematics of the National Academy of Sciences of Ukraine
- Taras Shevchenko National University of Kyiv
- International Geometry Center
- Kyiv Mathematical Society

SCIENTIFIC COMMITTEE

Drozd Yu.

(Kyiv, Ukraine)

Maksymenko S.

(Kyiv, Ukraine)

Plaksa S.

(Kyiv, Ukraine)

Prishlyak A.

(Kyiv, Ukraine)

Bakhtin O.

(Kyiv, Ukraine)

Balan V.

(Bucharest, Romania)

Banakh T.

(Lviv, Ukraine)

Borysenko O.

(Kharkiv, Ukraine)

Cherevko Ye.

(Odesa, Ukraine)

Fedchenko Yu.

(Odesa, Ukraine)

Karlova O.

(Chernivtsi, Ukraine)

Kiosak V.

(Odessa, Ukraine)

Konovenko N.

(Odessa, Ukraine)

Lyubashenko V.

(Kyiv, Ukraine)

Matsumoto K.

(Yamagata, Japan)

Mormul P.

(Warsaw, Poland)

Mykhailyuk V.

(Chernivtsi, Ukraine)

Plachta L.

(Krakov, Poland)

Pokas S.

(Odessa, Ukraine)

Sabitov I.

(Moscow, Russia)

Savchenko O.

(Kherson, Ukraine)

Sergeeva A.

(Odessa, Ukraine)

Shelekhov A.

(Tver, Russia)

Zarichnyi M.

(Lviv, Ukraine)

ADMINISTRATIVE COMMITTEE

- Egorov B., chairman, rector of the ONAFT;
- Povarova N., deputy chairman, Pro-rector for scientific work of the ONAFT;
- Mardar M., Pro-rector for scientific-pedagogical work and international communications of the ONAFT;
- Fedosov S., Director of the International Cooperation Center of the ONAFT;
- Kotlik S., Director of the P.M. Platonov Educational-scientific institute of computer systems and technologies "Industry 4.0";
- Lishchenko N. Dean of faculty of the computer systems and automation ONAFT

ORGANIZING COMMITTEE

Cherevko Ye.
Eftekharinasab K.
Fedchenko Yu.
Feshchenko B.
Khohlyk O.

Klishchuk B.
Konovenko N.
Kravchenko A.
Kuznietsova I.
Maksymenko S.

Osadchuk E.
Plakosh A.
Prus A.
Sergeeva A.
Soroka Yu.

Geometrical Langlands Ramifications and Differential Operators Classification by Verma Module Extensions

Prof. Dr. Francisco Bulnes

(Department of Research in Mathematics and Engineering, TESCHA, Federal Highway
Mexico-Cuautla Tlapala “La Candelaria”, Chalco. State of Mexico, P. C. 56641, Mexico.)

E-mail: francisco.bulnes@tesch.edu.mx

Studies realized to the differential operator classification have been realized using the generalized Verma modules as classifying spaces defined by the geometrical Langlands correspondences through of functors characterized for integral transforms to define the equivalences between geometrical objects of holomorphic bundles and objects of an algebra of operators. Likewise are characterized the Lie algebras of these differential operators under the Hecke categories and their classifying spaces as Verma modules extensions. Likewise, is had the following result:

Theorem 1. (F.Bulnes). *The derived category of quasi- G - invariants $D_{G/H}$ - modules formed with the extended and generalized Verma modules given for ${}^L\Phi^\mu({}^L(\mathcal{M})) = \mathcal{M} \boxtimes \rho^\mu(\mathbb{V})$, $\forall \mathbb{V} \in (Loc_L)$, can be identified for a critically twisted sheaves category of D -modules on the moduli stack $\text{Bun}_{G,y}$, $\forall y \in X$ (singularity) identified by the Hecke category $\mathcal{H}_{G,K,y}$, (geometrical Langlands correspondence), if this is an image of integral transforms acting on ramifications of the Hecke category \mathcal{H}_G , $\forall \lambda \in \mathfrak{h}^*$ (for example $\mathcal{H}_{G,\lambda}$) on the flag manifold G/B , with weight corresponding to twisted differential operators on $\text{Bun}_{G,y}$.*

Key words: Langlands correspondence, Hecke sheaves category, moduli stacks, Verma modules, generalized D -modules, Verma Module Extensions.

2010 AMS Classification. 53D37; 11R39; 14D24; 83C60; 11S15.

REFERENCES

- [1] F. Bulnes, Geometrical Langlands Ramifications and Differential Operators Classification by Coherent D -Modules in Field Theory, *Journal of Mathematics and System Sciences*, 3, (10), pp491–507. <https://doi.org/10.17265/2159-5291/2013.10.002>
- [2] Bulnes, F. (2018). Cycles Cohomology and Geometrical Correspondences of Derived Categories to Field Equations. *JOURNAL OF ADVANCES IN MATHEMATICS*, 14(2), 7880–7892. <https://doi.org/10.24297/jam.v14i2.7581>
- [3] F. Bulnes, *Integral Geometry Methods in the Geometrical Langlands Program*, SCIRP, USA, 2016. ISBN: 978-1-61896-140-2.

Зміст

E. Afanas'eva <i>Finitely bi-Lipschitz homeomorphisms between Finsler manifolds</i>	3
Aliyev Yagub <i>About longest and shortest chords passing through a fixed point</i>	5
S. Antonyan <i>Some equivariant properties of Milnor's construction</i>	6
K. Antoshyna, S. Kozerenko <i>Commuting sets for topological set operators</i>	7
B. Apanasov <i>Asymptotic analysis of quasi-regular mappings in space</i>	8
M. J. Atteya <i>Generalized (σ, τ)-derivations on associative rings satisfying certain identities</i>	10
V. Balan <i>The Tucker HO-SVD and the anisotropy of Finslerian geometric models</i>	11
V. Balashchenko, D. Vylegzhanin <i>Invariant structures on homogeneous Φ-spaces and Lie groups</i>	13
T. Banakh <i>Every 2-dimensional Banach space has the Mazur-Ulam property</i>	15
A. Bandura, V. Baksa, O. Skaskiv <i>A connection between L-index of vector-valued entire function and L-index of each its component</i>	16
B. Baratov, Yu. Eshkabilov <i>Separable cubic stochastic operators</i>	18
V. Bilet, O. Dovgoshey <i>Asymptotically equivalent subspaces of metric spaces</i>	20
E. Bonacci <i>Isomorphic issues about the CTCs in Quantum Physics</i>	22
P. Petrenko, A. Andreev <i>Geometrical Langlands Ramifications and Differential Operators Classification by Verma Module Extensions</i>	23
Y. Cherevko, V. Berezovski, J. Mikeš, Y. Fedchenko <i>Conharmonic Transformations of Locally Conformal Kähler Manifolds</i>	24
V. Chernov <i>Applications of Linking to the Study of Causality</i>	26
A. Bakhtin, I. Denega <i>Problem on extremal decomposition of the complex plane</i>	27
A. Dikarev, A. S. Galaev <i>Parallel spinors on Lorentzian Weyl spaces</i>	29
Yu. A. Drozd <i>Matrix problems, triangulated categories and stable homotopy types</i>	30
V. S. Dryuma <i>On the properties smooth manifolds defined by intersections</i>	31
K. Eftekharinasab <i>Some applications of transversality for infinite dimensional manifolds</i>	33
S. Favorov <i>Uniqueness theorems for almost periodic objects</i>	34
V. Fedorchuk, V. Fedorchuk <i>On symmetry reduction and some classes of invariant solutions of the $(1 + 3)$-dimensional homogeneous Monge-Ampère equation</i>	35
B. Feshchenko <i>Deformations of circle-valued Morse functions on 2-torus</i>	37