



International  
Scientific Conference

# Algebraic and Geometric Methods of Analysis

26-30 may 2020  
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 problems in mathematical analysis
- Geometric and topological methods in natural sciences

## ORGANIZERS

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

## PROGRAM COMMITTEE

<b>Chairman: Prishlyak A.</b> ( <i>Kyiv, Ukraine</i> )	<b>Kiosak V.</b> ( <i>Odesa, Ukraine</i> )	<b>Pokas S.</b> ( <i>Odesa, Ukraine</i> )
<b>Balan V.</b> ( <i>Bucharest, Romania</i> )	<b>Kirillov V.</b> ( <i>Odesa, Ukraine</i> )	<b>Polulyakh E.</b> ( <i>Kyiv, Ukraine</i> )
<b>Banakh T.</b> ( <i>Lviv, Ukraine</i> )	<b>Konovenko N.</b> ( <i>Odesa, Ukraine</i> )	<b>Sabitov I.</b> ( <i>Moscow, Russia</i> )
<b>Bolotov D.</b> ( <i>Kharkiv, Ukraine</i> )	<b>Lyubashenko V.</b> ( <i>Kyiv, Ukraine</i> )	<b>Savchenko A.</b> ( <i>Kherson, Ukraine</i> )
<b>Borysenko O.</b> ( <i>Kharkiv, Ukraine</i> )	<b>Maksymenko S.</b> ( <i>Kyiv, Ukraine</i> )	<b>Sergeeva A.</b> ( <i>Odesa, Ukraine</i> )
<b>Cherevko Ye.</b> ( <i>Odesa, Ukraine</i> )	<b>Matsumoto K.</b> ( <i>Yamagata, Japan</i> )	<b>Shelekhov A.</b> ( <i>Tver, Russia</i> )
<b>Fedchenko Yu.</b> ( <i>Odesa, Ukraine</i> )	<b>Mormul P.</b> ( <i>Warsaw, Poland</i> )	<b>Volkov V.</b> ( <i>Odesa, Ukraine</i> )
<b>Karlova O.</b> ( <i>Chernivtsi, Ukraine</i> )	<b>Mykhailyuk V.</b> ( <i>Chernivtsi, Ukraine</i> )	<b>Zarichnyi M.</b> ( <i>Lviv, Ukraine</i> )
	<b>Plachta L.</b> ( <i>Krakov, Poland</i> )	

## 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";
- Svytyy I., Dean of the Faculty of Computer Systems and Automation.

## ORGANIZING COMMITTEE

Kirillov V.  
Konovenko N.  
Fedchenko Yu.

Maksymenko S.  
Cherevko Ye.

Osadchuk E.  
Prus A.

ІНТЕРНАЦІОНАЛЬНИЙ ЦЕНТР СПІВРОБІТНИЦТВА

## Fejer Sums and the von Neumann Ergodic Theorem

Alexander Kachurovskii

(Sobolev Institute of Mathematics, Novosibirsk, Russia)

*E-mail:* agk@math.nsc.ru

The Fejér sums of periodic measures and the norms of the deviations from the limit in the von Neumann ergodic theorem are calculated, in fact, using the same formulas (by integrating the Fejér kernels), so this ergodic theorem is a statement about the asymptotics of the growth of the Fejér sums at zero for the spectral measure of the corresponding dynamical system.

As a result, well-known estimates for the rates of convergence in the von Neumann ergodic theorem can be restated as estimates of the Fejér sums at the point for periodic measures. For example, natural criteria for the polynomial growth and polynomial decrease in these sums can be obtained.

On the contrary, available in the literature, numerous estimates for the deviations of Fejér sums at a point can be used to obtain new estimates for the rate of convergence in this ergodic theorem. For example, for many dynamical systems popular in applications, the rates of convergence in the von Neumann ergodic theorem can be estimated with a sharp leading coefficient of the asymptotic by applying S.N. Bernstein's more than hundred-year old results in harmonic analysis.

### REFERENCES

- [1] Alexander G. Kachurovskii, Kirill I. Knizhov. Deviations of Fejer Sums and Rates of Convergence in the von Neumann Ergodic Theorem. *Dokl. Math.*, 97(3) : 211–214, 2018.
- [2] Alexander G. Kachurovskii, Ivan V. Podvigin. Fejer Sums for Periodic Measures and the von Neumann Ergodic Theorem *Dokl. Math.*, 98(1) : 344–347, 2018.

## Зміст

<b>G. M. Abdishukurova, A. Ya. Narmanov</b> <i>On the geometry of submersions</i>	<b>3</b>
<b>B. N. Apanasov</b> <i>Hyperbolic 4-cobordisms, Teichmuller spaces and quasiregular mappings in space</i>	<b>5</b>
<b>Aymaz I., Kansu M.</b> <i>Representation of gravi-electromagnetism using matrix algebra</i>	<b>7</b>
<b>V. Bilet, O. Dovgoshey</b> <i>Uniqueness of pretangent spaces at infinity</i>	<b>9</b>
<b>Bolotov D.</b> <i>Foliations of 3-manifolds with small module of mean curvature</i>	<b>10</b>
<b>Bolsinov A. V.</b> <i>On integrability of geodesic flows on 3-dimensional manifolds</i>	<b>11</b>
<b>E. Bonacci</b> <i>Algebraic and geometric questions about the EM helix</i>	<b>12</b>
<b>Borisenko A. A., Sukhorebska D. D.</b> <i>Geodesics on regular tetrahedra in spherical space</i>	<b>13</b>
<b>F. Bulnes</b> <i>Motivic hypercohomology solutions in field theory II</i>	<b>14</b>
<b>I. Denega</b> <i>Estimate of maximum of the products of inner radii of mutually non-overlapping domains</i>	<b>16</b>
<b>A. Dudko, V. Pivovarchik</b> <i>Inverse problem for tree of Stieltjes strings</i>	<b>18</b>
<b>N. Glazunov</b> <i>Formal groups and algebraic cobordism</i>	<b>20</b>
<b>O. Gok</b> <i>A note on tensor product of Archimedean vector lattices</i>	<b>22</b>
<b>E. Gül.</b> <i>Trace Regularization Problem On a Banach Space</i>	<b>24</b>
<b>O. Ye. Hentosh</b> <i>Centrally extended generalization of the superconformal loop Lie algebra and integrable heavenly type systems on supermanifolds</i>	<b>26</b>
<b>B. Hladysh, A. Prishlyak</b> <i>Structure of functions on an oriented 2-manifold with the boundary</i>	<b>28</b>
<b>D. A. Juraev</b> <i>The Cauchy problem for matrix factorizations of the Helmholtz equation in a multidimensional bounded domain</i>	<b>30</b>
<b>A. Kachurovskii</b> <i>Fejer Sums and the von Neumann Ergodic Theorem</i>	<b>31</b>
<b>B. N. Khabibullin, R. R. Muryasov</b> <i>Mixed volumes/areas and distribution of zeros of holomorphic functions</i>	<b>33</b>
<b>B. Klishchuk, R. Salimov</b> <i>On the behavior at infinity of one class of homeomorphisms</i>	<b>35</b>
<b>A. Kravchenko, S. Maksymenko</b> <i>Automorphisms of cellular divisions of 2-sphere induced by functions with isolated critical points</i>	<b>37</b>
<b>A. Kushner, E. Kushner, R. Matviichuk</b> <i>Dynamics and exact solutions of linear PDEs</i>	<b>39</b>