

**DEPARTMENT OF NON-HARMONIC ANALYSIS**  
**Institute of Mathematics and Mechanics**  
**National Academy of Sciences of Azerbaijan**

**BRIEF REPORT ON SCIENTIFIC & ORGANIZATIONAL ACTIVITIES**  
**FOR THE YEAR 2019**

12 research works have been done on the topics of “Frame theory and its applications” and “Basis properties of root functions of non-self-adjoint differential operators” by the employees of the Department of Non-Harmonic Analysis (DNHA) in 2019.

There are 19 employees in DNHA, including 3 Doctors of Sciences (2 of them part-timers), 8 PhD’s (2 of them part-timers), 2 researchers, and 6 laboratory assistants (2 of them being employed since 17.10.2019).

53 research works have been published by the employees of DNHA in 2017, including 12 scientific articles (7 of them published abroad; TR-6; SCOPUS-7) and 1 monograph. Short summaries of 40 research works by the employees of DNHA have been included in proceedings of various scientific conferences. Besides, 6 articles have been accepted and some 10 articles have been submitted for publication in various scientific journals.

Articles	Printed abroad	Printed in Azerbaijan	Short summaries	Monographs
12	7	5	40	1

**ARTICLES PUBLISHED IN THE JOURNALS INDEXED IN WEB OF SCIENCE**

1. B.T. Bilalov, A.A. Huseynli, S.R. El-Shabrawy. Basis Properties of Trigonometric Systems in Weighted Morrey Spaces. Azerbaijan Journal of Mathematics, V. 9, No 2, 2019, pp. 183-209
2. Bilalov B.T. The Basis Property of a Perturbed System of Exponentials in Morrey-Type Spaces. Siberian Mathematical Journal, vol. 60, no. 2, 2019 , pp. 249–271
3. B.T.Bilalov, F.Sh. Seyidova. Basicity of a system of exponents with a piecewise linear phase in Morrey-type spaces. Turkish J. of Math., 43, (2019), pp. 1850-1866
4. B.T.Bilalov, T.B.Kasumov, G.B.Maharramova. On basicity of eigenfunctions of one second order differential operator with discontinuity for Lebesgue spaces. Diff. uravneniya, 2019, v.55, №12, p. 1-10 (*in Russian*)
5. Ali Huseynli, Esmer Mirzabalayeva.  $L_{p,r}$  spaces: Cauchy singular integral, Hardy classes and Riemann-Hilbert problem in this framework, Sahand Communications in Mathematical Analysis (SCMA) Vol. 16 No. 1 (2019), 83-91
6. Shukurov, A. Sh., Kasumov, Z. A. On Frame Properties of Iterates of a Multiplication Operator. Results in Mathematics. 74 (2019), no. 2, 74:84.
7. N.R. Ahmadzade, Z.A. Kasumov. On the Dirichlet problem for the Laplace equation with boundary value from the Morrey space. On the Dirichlet problem for the Laplace equation with the boundary value in Morrey space, Eurasian Math. J., 2018, Volume 9, Number 4, 9–21

## INTERNATIONAL COOPERATION

- Aligarh Muslim University
- Yildiz Technical University
- Bashkir State Pedagogical University
- Sterlitamak branch of Bashkir State University

### PLENARY REPORTS BY DNHA EMPLOYEES

<b>Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan</b>	Riemann problem in Smirnov classes with exponential weight	International Conference on Mathematical Advances and Applications (2nd ICOMAA2019), Istanbul, Turkey, 3-5 May, 2019
<b>Associate Prof. Migdad Ismaylov</b>	Basis properties of exponential and trigonometric systems in grand-Lebesgue spaces	International Conference on Mathematical Advances and Applications (2nd ICOMAA2019), Istanbul, Turkey, 3-5 May, 2019

### SCIENTIFIC VISITS

<b>Time Period</b>	<b>Employee</b>	<b>Destination (city, country)</b>	<b>Purpose of the visit</b>
03.05.2019- 10.05.2019	Bilal Bilalov	Istanbul, Turkey	Plenary report at the International Conference on Mathematical Advances and Applications (2 <sup>nd</sup> ICOMAA2019), Istanbul, Turkey, 3-5 May 2019
03.05.2019- 10.05.2019	Migdad Ismaylov	Istanbul, Turkey	Plenary report at the International Conference on Mathematical Advances and Applications (2 <sup>nd</sup> ICOMAA2019), Istanbul, Turkey, 3-5 May 2019

### REVIEWERSHIP FOR PEER REVIEWED INTERNATIONAL REFERRED JOURNALS

- Zentralblatt MATH
- Mathematical Reviews
- Communications in Statistics – Theory and Methods (**TR-Science Citation Index Expanded**)
- Turkish Journal of Mathematics (**TR-Science Citation Index Expanded**)
- Kragujevac Journal of Mathematics-**SCOPUS** (Serbia)

- Sarajevo Journal of Mathematics (Bosnia and Herzegovina)

**Journals prepared for publication by DNHA in 2019:**

- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 9, No 1, 2019, JANUARY**
- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 9, No 2, 2019, JULY**
- **CASPIAN JOURNAL OF APPLIED MATHEMATICS, ECOLOGY AND ECONOMICS, VOLUME 7, No 1, 2019, JULY**

**The ranking of AZERBAIJAN JOURNAL OF MATHEMATICS has been raised from Q3 to Q2 in 2019**

**SUCCESSFULLY DEFENDED MASTER THESES**

Author	Title	Scientific Advisor
Hayale Gadirova	Wavelet analysis and its application to one-dimensional signal filtration	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan

**PROGRAMMES and GRANTS**

№	Project	Title	Supervisor
1	Scientific research programme launched by the NAS of Azerbaijan	Approximation by neural networks and some problems of frames	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan
2	1st Azeri-Russian International Grant Competition organized by the Science Development Foundation under the President of the Republic of Azerbaijan <i>(suspended since February 2019)</i>	Methods of the theory of functions in the theory of operators	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan
3	4th My First Grant competition for young scientists organized by the Science Development Foundation under the President of the Republic of Azerbaijan <i>(expired)</i>	Completeness of double exponential system with variable summability index in weighted Lebesgue spaces	Aida Guliyeva

4	Integration of Science and Education grant competition organized by the Science Development Foundation under the President of the Republic of Azerbaijan	Spectral problems and their applications to anisotropic coatings tensile strains	Toghrul Muradov
5	06.09.2019 Contract between IMM of the NAS of Azerbaijan and Azercosmos Ltd.	NDVI analysis of spectral images	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan
6	A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey ((TÜBİTAK)  (agreed on 23.10.2019)	Frame properties of the system of eigenfunctions of a second order discontinuous differential operator	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan

<b>PEDAGOGICAL ACTIVITIES BY DNHA EMPLOYEES</b>	
Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan	1) Lectures on Harmonic Analysis for 1st year master students in the Institute of Mathematics and Mechanics of the NAS of Azerbaijan) 2) Lectures on Modern Problems of Mathematics for 1st year master students in the Institute of Mathematics and Mechanics of the NAS of Azerbaijan)
Associate Prof. Telman Kasumov	Baku State University
Associate Prof. Migdad Ismaylov	Baku State University
Associate Prof. Terlan Garayev	Khazar University
PhD Ali Huseynli	Khazar University

<b>Membership in organizing committees of international conferences</b>	
Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan	2nd International Conference on Mathematical Advances and Applications (2nd ICOMAA2019), Istanbul, Turkey, 3-5 May, 2019
	International Conference on Spectral Theory and Its Applications dedicated to the 80 <sup>th</sup> birthday of Academician Mirabbas Gasymov, Baku, Azerbaijan, 7-8 June 2019

	International Scientific Conference on Physics of Condensed Matter and Related Problems dedicated to the 70 <sup>th</sup> birthday of Professor A.I.Filippov, Sterlitamak, Russia, 2-5 October 2019
	International Conference on Modern Problems of Mathematics and Mechanics, dedicated to the 60th anniversary of the Institute of Mathematics and Mechanics of the NAS of Azerbaijan, Baku, Azerbaijan, 23-25 October, 2019
Ali Huseynli	Operators, Functions, and Systems of Mathematical Physics Conference, Khazar University, Baku, Azerbaijan, 10-14 June 2019
	2nd International Conference on Mathematical Advances and Applications (2nd ICOMAA2019), Istanbul, Turkey, 3-5 May 2019
Aida Guliyeva	International Conference on Modern Problems of Mathematics and Mechanics, dedicated to the 60th anniversary of the Institute of Mathematics and Mechanics of the NAS of Azerbaijan, Baku, Azerbaijan, 23-25 October, 2019
<b>SEMINARS HELD BY DNHA</b>	
Every Wednesday at 12 <sup>00</sup>	Some problems of non-harmonic analysis
Every Tuesday and Thursday at 11 <sup>00</sup>	Theory of frames and its applications

<b>SPEECHES MADE BY DNHA EMPLOYEES IN IMM SEMINARS</b>		
<b>06.03.2019</b>	Some approximation problems in grand-Lebesgue spaces	Associate Prof. Migdad Ismaylov
<b>22.05.2019</b>	Banach spaces (Orlicz spaces). Riemann boundary value problems. Applications to basis-related problems	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan
<b>02.10.2019</b>	On basis properties of linear phase exponential system in Banach spaces	Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan

<b>SOCIAL ACTIVITIES BY DNHA EMPLOYEES</b>	
Prof. Bilal Bilalov, Corresponding Member of	<ul style="list-style-type: none"> <li>Member of the Presidium of the NAS of Azerbaijan Committee for <b>National</b></li> </ul>

the NAS of Azerbaijan	<p><b>Development Programme</b> for 2020-2030;</p> <ul style="list-style-type: none"> <li>• Member of the Editorial Board of Azerbaijan National Encyclopedia;</li> <li>• Editor-in-Chief of Azerbaijan Journal of Mathematics;</li> <li>• President of the Actuarial Society of Azerbaijan;</li> <li>• Member of the Terminology Committee of the Cabinet of Ministers of Azerbaijan;</li> <li>• Chairman of the Academic Council on Applied Mathematics;</li> <li>• Deputy Chairman of the Academic Council on Mathematical Problems;</li> <li>• Editor-in-Chief of Caspian Journal of Applied Mathematics, Ecology and Economics;</li> <li>• Chairman of the Baku State University Graduation Commission;</li> <li>• Expert on evaluation of textbooks with the Ministry of Education of the Republic of Azerbaijan.</li> </ul>
Associate Prof. Terlan Garayev	Executive Editor of Caspian Journal of Applied Mathematics, Ecology and Economics
Aida Guliyeva	<ul style="list-style-type: none"> <li>• Executive Editor of Azerbaijan Journal of Mathematics, Caspian Journal of Applied Mathematics, Ecology and Economics and Journal of Contemporary Applied Mathematics</li> <li>• Member of the International Editorial Board of MATH:Modelling &amp; Application &amp; Theory</li> </ul>

<p><b>BOOKS &amp; MONOGRAPHS AUTHORED BY DNHA EMPLOYEES AT BOOKEXPO AMERICA (29-31 May 2019, New York)</b></p>
<ol style="list-style-type: none"> <li>1. Muradov T.R., Aslanov R.M., Lee O.V. Brief Course of Mathematical Analysis (<i>in Russian</i>)</li> <li>2. Muradov T.R. Basicity properties of systems in Banach spaces and their applications (<i>in Russian</i>)</li> <li>3. Aslanov R.M., Nizhnikov A.I., Mukhanova A.A., Mukhanov S.A., Muradov T.R. Book of problems in higher mathematics. Volume V.I (<i>in Russian</i>)</li> </ol>

<b>SCHOLAR.GOOGLE.COM_CITATIONS</b>	
Bilal Bilalov	90
Telman Kasumov	23
Toghrul Muradov	3
Vidadi Mirzoyev	3
Aydin Shukurov	7
Terlan Garayev	1
Ali Huseynli	4
Zaur Kasumov	1
Aida Guliyeva	22
<b>TOTAL</b>	<b>154</b>

### **IMPORTANT WORK**

Shukurov A.Sh., Kasumov Z.A. *On Frame Properties of Iterates of a Multiplication Operator*, Results in Mathematics. 74 (2019), no. 2, 74:84.

### **Prof Bilal T. Bilalov**

Head of the Department of Non-Harmonic Analysis

Corresponding Member of the National Academy of Sciences of Azerbaijan