

**SEMI-ANNUAL REPORT OF “MATHEMATICAL ANALYSIS”
DEPARTMENT ON SCIENTIFIC AND SCIENTIFIC ACTIVITY FOR 2018**

The staff of “Mathematical Analysis” department consists of 11 research associates, including 2 doctor of sciences, professor, one corresponding member of ANAS.

1. Vagif Guliyev – head of department (doct. phys. math. sci. prof. Corr. member of ANAS).
2. Rovshan Bandaliyev- sen. res. ass. (doct. math. sci. prof. of ANAS).
3. Elman Ibrahimov – cand. phys. math. sci., ass. prof., lead. res. ass.
4. Hajibeyov Mubariz- cand. phys. math. sci., ass. prof., lead. res. ass.
5. Zaman Safarov - cand. phys. math. sci., ass. prof., lead. res. ass.
6. Elmira Hajiyeva – cand. phys. math. sci., res. ass.
7. Mehriban Omarova – ph. doctor in math., sen. res. ass.
8. Lala Aliyeva - ph. doctor in math., sen. res. ass.
9. Fatayi Isayev – cand. phys. math. sci., res. ass.
10. Aytakin Abdullayeva – res. ass.
11. Aynur Mammadova – res. ass.

I. SCIENTIFIC PART

In 2018, according to the affirmed plan, six scientific works on the themes of “Modern problems of harmonic analysis” were carried out.

Work 1: Global regularity of discontinuous coefficient non-divergen elliptic equations in local Orlicz-Morrey-type spaces.

Executor: Head of department, corr. member of ANAS, prof. V.S. Guliyev, ph. doctor in math., ass. prof., sen. res. ass. M.N. Omarova

The work on global regularity of discontinuous coefficient non-divergent elliptic equations in local Orlicz-Morrey-type spaces is being continued. On these studies, the following papers were published.

1. V.S. Guliyev, M.N. Omarova, M.A. Ragusa, A. Scapellato, *Commutators and generalized local Morrey spaces*. J. Math. Anal. Appl. 457 (2) (2018), 1388–1402. **(IF-1.064)**
2. V.S. Guliyev, A.A. Ahmadli, M.N. Omarova, L.G. Softova, Global regularity in Orlicz-Morrey spaces of solutions to nondivergence elliptic equations with VMO coefficients. Electron. J. Differential Equations, Vol. 2018 (2018), No. 110, pp. 1-24. **(IF - 0.954)**
3. V.S. Guliyev, J.J. Hasanov, X.A. Badalov, *Maximal and singular integral operators and their commutators on generalized weighted Morrey spaces with variable exponent*. Math. Inequal. Appl. 21 (1) (2018), 41–61. **(IF - 0.603)**

Talks given at Conferences:

1. V.S. Guliyev, *Characterization of Lipschitz functions via the commutators of singular and fractional integral operators in Orlicz spaces* **(plenary)**
2. V.S. Guliyev, *Function spaces and integral operators associated with Schrödinger operators*, International Conference on "Mathematical Analysis, Differential Equation & Applications MADEA 8" June 17-23, 2018 in Cholpon-Ata (Issyk-Kul), Kyrgyz Republic, pp. 62. **(plenary)**
3. V.S. Guliyev, *Maximal operator and its commutators in generalized Orlicz-Morrey spaces on spaces of homogeneous type*, International Conference on "Mathematical Analysis, Differential Equation & Applications MADEA 8" June 17-23, 2018 in Cholpon-Ata (Issyk-Kul), Kyrgyz Republic, pp. 63. **(plenary)**
4. M.N. Omarova, *Marcinkiewicz integral associated with Schrodinger operator on vanishing generalized Morrey spaces*, International Conference on "Mathematical

Analysis, Differential Equation & Applications MADEA 8” June 17-23, 2018 in Cholpon-Ata (Issyk-Kul), Kyrgyz Republic, pp. 95.

Work 2: Some integral operators of harmonic analysis in functional Banach spaces.

Executor: doct. of math. sc., ass. prof., lead. r. a. R.A. Bandaliyev, cand. phys. math. sci., ass. prof., lead. res. ass. Z.V. Safarov.

The Riesz-Kolmogorov type compactness criterion in variable degree Lebesgue space given in metric space, was given. Furthermore, not imposing weak Dini-Lipschits condition on the function determining variable degree, the necessary condition for the compactness of the set from this space.

The following papers were published.

1. R.A. Bandaliyev, P. Gorka, Relatively compact sets in variable-exponent Lebesgue spaces, Banach Jour. Math. Analysis, (12) (2018), p. 331-346. (IF-0,833).
2. R.A. Bandaliyev, V.S. Guliyev, S.G. Hasanov, Two-weighted inequalities for Riesz potential in p -convex weighted modular Banach function space. Ukrainian Mathematical Journal, 69 (11) (2018), 1673-1688. (IF- 0.228)

Talks given at Conferences:

3. R.A. Bandaliyev, Hausdorff operator in variable Lebesgue spaces, Modern methods, problems and applications of operator theory and harmonic analysis VIII, Rostov-na-Donn, 22 - 27 April, 2018, pp. 107.

Work 3: Two-weighted inequalities for fractional order integrals in hypergroups.

Executor: Hajibeyov Mubariz- cand. phys. math. sci., ass. prof., lead. res. ass.

Two-weighted inequalities for fractional order integrals in hypergroups are studied. M. hajibeyov's paper "Two weighted inequalities for fractional integrals on commutative hypergroups" was published in "Transactions of NAS of Azerbaijan, Issue Mathematics Series of Physical-Technical and Mathematical Sciences".

The list of published papers:

1. M.G. Hajibayov, E.A. Gadjieva, *Two weighted inequalities for fractional integrals on commutative hypergroups*, Transactions of NAS of Azerbaijan, Issue Mathematics, 38 (1), 69–78 (2018).

Work 4: Mean convergence of Fourier-Jacobian series.

Executor: cand. ph. m. s., lead. r. a. E.J. Ibrahimov, cand. phys. math. sci., res. ass. Elmira Hajiyeva.

The list of published papers:

1. V.S. Guliyev, E. Ibrahimov, *Necessary and sufficient conditions for the boundedness of the Gegenbauer-Riesz potential on Morrey spaces*, Georgian Mathematical Journal, 25 (2018), no. 2, 235-248. (IF - 0.290)

Talks given at Conferences:

1. E. Ibrahimov, The Hardy-Littlewood-Sobolev theorem for Riesz potential generated by gegenbauer operator, International Conference on "Mathematical Analysis, Differential Equation and Applications MADEA 8" June 17-23, 2018 in Cholpon-Ata (Issyk-Kul), Kyrgyz Republic, pp. 64.

Work 5: Boundedness of B-maximal operator and B-singular operator in Orlicz spaces.

Executor: cand. phys. math. sci., res. ass. Fatayi Isayev, ph. doctor in math., sen. res. ass. Lala Aliyeva

F. Isayev studies boundedness of B-maximal operator and B-singular operator in Orlicz spaces, and of B-hyperbolic potential in Lebesgue space. The paper "Fractional integral associated to Schrodinger operator on the Heisenberg groups in vanishing generalized Morrey" was sent to scientific journals to be published.

L. Aliyeva studies some local properties of singular integrals in the terms of mean oscillation.

The list of published papers:

1. R.M. Rzaev, Z. Sh. Gakhramanova, L.R. Alieva, *On Generalized Besov and Campanato Spaces*, Ukrainian Mathematical Journal, 69 (8) (2018), 1275–1286 .
2. M.Ə. Şahverdiyev, A.H. Həsənova, S.Ə. Həsənova, L.R. Əliyeva, Riyazi analiz, Dərs vəsaiti, 2018, p. 144.

Work 6: Korovkin type theorems in variable degree Lebesgue spaces.

Executor: res. ass. Aytekin Abdullayeva, res. ass. Aynur Mammadova

Korovkin type theorems are studied in variable degree Lebesgue spaces.

II SCIENTIFIC ORGANIZATIONAL ACTIVITY

- The main priority of the department is modern problems of harmonic analysis.
- In the department the research works are carried out on 6 themes.
- The department staff consists of 8 collaborators. One of them is a professor (corr. member of ANAS), one doctor of sciences (professor of ANAS), 4 associate professor, 1 senior res. ass., 4 res. ass., 2 engineer programmer, 2 senior laboratory assistants, 3 laboratory assistants.
 - Prof. V.S. Guliyev, doc. R.A. Bandaliyev, doc. E.C. İbrahimov, ph.d. F.A. İsayev, ph.d. M.N. Omarova, ph.d. L. Aliyeva, A.E. Abdullayeva, A.N. Mammadova regularity take part at the institute seminars.
- The project "Function spaces and applications to partial differential equations" submitted to "The first Azerbaijan-Russian joint international grant competition" was the winner of 2018 competition.
- Prof. V.S. Guliyev has participated in the international Conference "Modern Methods, Problems and Applications of Operator Theory and Harmonic Analysis VIII" held on 23-28 April, 2018 in Southern Federal University in Rostov Na-Donu

city of Russia with his report "Characterization of Lipschitz functions via the commutators of singular and fractional integral operators in Orlicz spaces"

- On may 21-24, 2018 he has participated with a plenary lecture "Generalized Morrey regularity for parabolic equations with discontinuous data" at the International Conference "Operators, Functions, and Systems of Mathematical Physics" held at Gafgaz University.

- On may 16, 2018, prof. V.S. Guliyev at the institute seminar gave a report on "Characterization of Lipschitz functions via the commutators of singular and fractional integral operators in Orlicz spaces". Furthermore, Prof. V.S. Guliyev, doc. R.A. Bandaliev, doc. E.C. İbragimov, r.f.d F.A. İsayev, r.f.d. M.N. Omarova, r.f.d. L. Aliyeva, A.E. Abdullayeva, A.N. Mammadova regularly participated at the institute seminars.

- The seminar "Actual problems of harmonic analysis" functions on is held every friday of the week.

- Prof. V.S. Guliyev continues his activity as a member of the Supreme Attestation Commission under the President of the Republic of Azerbaijan.

- Prof. V.S. Guliyev is the member of editorial board of the international journals "Journal of Nonlinear Sciences and Applications" (J. Nonlinear Sci. Appl.), "Applied and Computational Mathematics", "Eurasian Mathematical Journals", "Communications de la Faculté des Sciences de l'Université d'Ankara. Séries A1. Mathematics and Statistics", and "TWMS Journal of Pure and Applied Mathematics" and republican journal "Proceedings of Institute of Mathematics and Mechanics of NAS of Azerbaijan", "Azerbaijan Journal of Mathematics", one of the editor-in-chiefs of "Caspian journal of applied mathematics, ecology and economics", the editor in chief of "Transactions of National Academy of Sciences of Azerbaijan, Series of Physical-Technical and Mathematical Sciences, Issue Mathematics" .

- The journal "Transactions of National Academy of Sciences of Azerbaijan, Series of Physical-Technical and Mathematical Sciences, Issue Mathematics" **vol. 38, no 1, 2018** was published.

During the report period, the department collaborators published 9 papers and 8 abstracts, 10 papers were admitted for publication, 15 papers were submitted for publication.

Head of the department
“Mathematical Analysis”

Corr. member of NASA,
prof.V.S. GULIYEV