Semi-annual report of the department of "Function Theory" for 2018

On scientific activity

On the report period 4 works connecting 7 executors on the theme "Approximation of functions of many variables by ridge functions, neural networks, linear and nonlinear superpositions, embedding theorems for functional spaces" are conducted. 7 papers were published, 2 of them in "Science Citation Index Expanded" base of the Thomson Reuters agency, 2 papers were accepted for publication, 8 papers were submitted to publication.

About works

Work1: "Characterization of extremal elements in approximation by linear superpositions"

(Executers: prof. of ANAS, dr. math. sci. Vugar Ismailov and junior researcher Aida Asgarova)

4 papers were published:

1. N.J. Guliyev, V.E. Ismailov, On the approximation by single hidden layer feedforward neural networks with fixed weights, Neural Networks 98 (2018), 296-304 (Thomson Reuters SCI), https://doi.org/10.1016/j.neunet.2017.12.007

2. V.E. Ismailov, A note on the criterion for a best approximation by superpositions of functions, Studia Mathematica 240 (2018), no. 2, 193-199, (Thomson Reuters SCI) https://doi.org/10.4064/sm170314-9-4

3. A.Kh. Asgarova, On a generalization of the Stone Weierstrass theorem, Annales mathématiques du Québec 42 (2018), Issue 1, 1–6, (Thomson Reuters ESCI) https://doi.org/10.1007/s40316-017-0081-2

4. Aida Kh. Asgarova, Arzu M-B. Babayev, Ibrahim K. Maharov, On the error of approximation by radial basis functions with fixed centers. Trans. of NAS of Azerbaijan, Issue Mathematics, 38 (1), 22–29 (2018). Ser. of Phys.-Tech. and Math. Sci.

Work 2: “Investigation of differential properties of functions from Morrey type spaces”

(Executers: dr. ph.-m. s., prof, Alik Najafov and PhD Aygun Orujova)

Published works:

1. Alik M. Najafov, Nilufer R. Rustamova, Some properties of grand Sobolev-Morrey type spaces. Transactions of A. Razmadze Mathematical Institute Volume 172, Issue 1, April 2018, Pages 82-89, https://doi.org/10.1016/j.trmi.2017.10.001 (Thomson Reuters ESCI)

2. Alik M. Najafov, Rovshan F. Babayev "Some properties of functions from generalized Sobolev-Morrey type spaces" Mathematica Aeterna, Vol. 7, 2017, no. 3, 301 – 311.

3. Alik M. Najafov, Nilufer R. Rustamova On properties of functions from Sobolev-Morrey type spaces with dominant mixed derivatives, Trans. of NAS of Azerbaijan, Issue Mathematics, 37 (4), 132–141 (2017).Ser. of Phys.-Tech. and Math. Sci.

Papers accepted for publication:

1. A.M. Najafov and R.E. Kerbalayeva, The embedding theorems for Besov-Morrey spaces of many groups of variables, Georgian Math. J.

2. A.M. Najafov, N.R. Rustamova, On some properties of functions from a Besov–Morrey type spaces, Afrika Matematika.

Papers submitted to publication:

1. Najafov A.M., Khadimova L. On smothness of solution for the higher-order partial differential equations, "Electronic Journal of Differential Equations".

2. Najafov A.M., N.R. Rustamova, Gasimova A.M. Интегральные представления функций, определенных в областях с условием гибкого φ рога, «Вестник Академии наук Чеченской Республики»

3. Najafov A.M., Babayev R.F. Some properties of functions from generalized Sobolev-Morrey type spaces with dominant mixed derivatives.

4. Najafov A.M., S. Alekberli Some properties of grand Sobolev–Morrey spaces with dominant mixed derivatives, Journal of Mathematical İnequalities

5. Orujova A.T., Mustafayeva F.F. Interpolation theorems on the Nikolskii-Morrey type spaces, Caspian Journal of Applied Mathematics, Ecology and Economics.

Work3: "Properties of discrete Hilbert transform and Berling transform". (executor: cand. ph.-m. s. Rashid Aliev)

Papers submitted to publication:

1. Rashid A.Aliev, Aynur F.Amrahova, Properties of the discrete Hilbert transform, Complex Analysis and Operator Theory.
2. Rashid A.Aliev, Xanim I.Nebiyeva, The A-integral and restricted Ahlfors-Beurling transform, Integral Transforms And Special Functions.
3. Rashid A.Aliev, Xanim I.Nebiyeva, The A-integral and restricted Riesz transform, Analysis and Mathematical Physics.

Work4: "Computation of the error of approximation by radial functions".

(Executors: cand. ph.-m. s. Ibrahim Maharov and cand. ph.-m. s. Arzu Babayev)

One paper was published:

1. Aida Kh. Asgarova, Arzu M-B. Babayev, Ibrahim K. Maharov, On the error of approximation by radial basis functions with fixed centers. Trans. of NAS of Azerbaijan, Issue Mathematics, 38 (1), 22 - 29 (2018). Ser. of Phys.-Tech. and Math. Sci.

On scientific-organizational activity

In the reporting period, head of the department, dr. in math. Vugar Ismailov and leading reseach associate cand. ph.-m. s. Rashid Aliev have given talks at the institute seminars.

All collaborators actively participated in the department's general works, including the institute seminar and department seminars.

Head of the department Vugar Ismailov was a member of the program Committee of the international conference “Operators Functions and Systems of Mathematical Physics Conference” (OFSMPC), 21-24 May, Khazar University. Leading scientific researcher Rashid Aliev gave a talk at this conference. C.ph.-m.s. Ibrahim Maharov, c.ph.-m.s. Arzu Babaev, PhD. Aygun Orujova, junior researcher Aida Asgarova submitted abstracts for publication in the proceedings of the conference.

Head of the department Vugar Ismailov was a member of the Scientific Committee of the international conference “Mathematical Analysis, Differential Equation & Applications MADEA 8” dedicated to the 80th birthday of Academician A.M. Samoilenko, held in June 17-23, 2018 in Cholpon-Ata (Issyk-Kul), Kyrgyz Republic.

The project entitled “Investigation of approximation properties of ridge functions and the MLP model of neural networks and applications” was successful in the grant competition announced by the Science Development Foundation under the President of the Republic of Azerbaijan.

To get a scientific title “doctor of mathematical sciences”, leading scientific researcher of the department Rashid Aliev defended his dissertation work entitled “Boundary properties of Cauchy type integrals of complex measures and some problems of the approximation theory of analytical functions” at the Dissertation Council of the Institute.

Head of the department prof. of ANAS, dr.math.sc. Vugar Ismailov