

On Seminar report of Functional analysis departament of IMM on scientific and scientific-organizational activity for 2021

The staff of “Functional Analysis” department consists of 21 employees including 18 research associates. 8 of them doctor of sciences, professor.

- 1.Aslanov Hamidulla I. doct. ph.m.s.,prof.sen.r.a.
- 2.Aliyev Soltan A. doct. ph.m.s.,prof.sen.r.a.
- 3.Mirzoyev Sabir S. doct. ph.m.s.,prof.sen.r.a.
- 4.Huseynov Hidayet M. doct. ph.m.s.,prof.sen.r.a.
- 5.Gurbanov Veli M. doct. ph.m.s.,prof.sen.r.a.
- 6.Nabiyev Ibrahim M. doct. ph.m.s.,prof.sen.r.a.
- 7.Aliyev Araz R. doct. ph.m.s.,prof.sen.r.a.
- 8.Eyvazov Elshad H. ph.m.s., lead.r.a.
- 9.Mukhtarov Fekhreiddin Sh. c.ph.m.s.,lead.r.a.
- 10.Jabrailova Afet N. c.ph.m.s.,lead.r.a.
- 11.Ibadova Irade A. c.ph.m.s.,lead.r.a.
- 12.Latifova Aygun R. phd in math.,chief.r.a.
- 13.Vahabov Nazim G. chief.r.a.
- 14.Guliyev Namiq I. c.ph.m.s.,r.a.
- 15.Khalilov Vuqar S. phd in math.,chief.r.a.
- 16.Alimardanova Kamilla A. c.ph.m.s.,chief. r.a.
- 17.Osmanli Jalala A. phd in math.,chief. r.a.

- 18.Safarova Aynur N.j.r.a.
- 19.Iskenderli Guller Z.sen.lab.ass.
- 20.Bayramova Aygun F.sen.lab.ass.
- 21.Dadashova Nigar Y.lab.ass.

I. Scientific part

In the first half of 2021, according to the approved plan, 18 works are executed on the topics "Study of some problems of operator algebra and probability theory" and "Spectral analysis of differential operators".

Study of some problems of operator algebra and probability.

- 1). Work : "Convergence of branching random processes with migration " **Ex.: doct.ph.m.sc., prof. sen.res.ass. S.A.Aliyev.**

Papers

- 1.S.A.Aliev. Forcing the system by a drift, Matematychni Studii, 55(2), 2021, p.14-19.
2. S.A.Aliev . Reliability of a series system with redundancy and one repair facility, Transactions of NAS of Azerbaijan, ser.phys.techn.and math.science, v.40(2020) issue4, p.40-48.

Abstract

1. S.A.Aliev.Limit distribution for the first passage time of the branching processes for level, Актуальные проблемы математики и информационной технологии, материалы II Всероссийской конференции с международным участием,г.Махачкала , 5-7 февраля 2021 г., с.13-15.

2). Work: "A class of Djabbarzadeh self-adjoint operators in Banach space". **Ex: sen.res.ass. N.G.Vahabov.**

During the reporting period, the structure of the spectrum of Norm-Hermit operators was studied and compared with other Hermit-type operators. An article was prepared and submitted for publication in the past.

3).work: "Study of random works described by autoregressive processes". **Ex: cand.ph.m.sc. ass.prof. lead.res.ass. I.A.Ibadova.**

Papers

1. S.A.Aliyev, I.A.Ibadova. Limit therems for the moment of the firstreaching a high leuel by branching processes. 2021 Naxçıvan Dövlət Unuversitetinin Əsərləri.(published)

Abstract

1. Ф.Г. Рагимов, И.А. Ибадова, А.В. Кулиева. Об одном семействе моментов первого пересечения нелинейных границ марковским случайным блужданием, описываемом процессом авторегрессии AR(1). Transactions of Azerbaijan National Academy of Sceince series Informatics and Control Problems 41 Issue 2, 2021.(published)

4). work: "Boundary value problems for random walks described by order one autoregressive process " **Ex: ph.d.in math. ass. prof. lead res. ass. V.S.Xalilov.**

Papers

- 1.F.H.Rahimov., V.S.Khalilov., T.E.Hashimova.On the generalization of the central limit theorem for the least-squares estimator of the unknown parameter in the autoregressive process of order one (AR(1)).Uzbek Mathematical Journal 2021,volume 65,Issue 3,pp.126-131. DOI:10,29229/uzmj.2021-3-12
2. S.A.Aliyev, I.A.Ibadova V.S.Xelilov. Limit theorems for the moment of the first reaching a high level by branching processes(published)

" **Ex:doct.ph.m.s., ass.prof. sen.res.ass. E.H.Eyvazov.**

Paper

- 1.Araz R. ALIEV, Elshad H. EYVAZOV, Shahin Sh. RAJABOV. On estimation of the number of eigenvalues of the magnetic Schrödinger operator in a three-dimensional layer, Turkish Journal of Mathematics, (2021) , vol. 45, no. 5, pp. 2260-2268, doi:10.3906/mat-2107-43.

Topic: "Spectral analysis of differential operators"

- 6). work: solvability Conditions for operator-differential equations and some spectral problem" **Ex: doct.ph.m.sc.prof. sen.res.ass. S.S.Mirzoyev.**

Over the past period of the reporting year, scientific research on the topic was continued and two articles were submitted for publication.

- 7).work: " Kolmogorov type Inequalities for the norm of intermediate derivative operators in the space of smooth vector functions".

Ex. doct.ph.m.sc.prof. sen.res.ass. H.I.Aslanov.

Papers

1. H.İ.Aslanov.G.M.Eyvazlı.On regular solvability of a boundary value problem for a fourth order operator differential equation on a finite segment Transactions of NAS of Azerbaijan , Issue Mathematics ,volume 41, №1, 2021, p 24-34.

2. H.İ.Aslanov.G.M.Eyvazlı. On Kolmogorov type inequalities for the norms of operators of intermediate derivatives on the space of smooth vector-functions on a finite segment .Proceedings of the Institute Mathematics and Mechanics, volume 47,number1, 2021, p.143-155.

Abstracts

1.Г.И.Асланов, Г.М.Эйвазлы.О корректной разрешимости одной краевой задачи для однородного операторно дифференциального уравнения четвертого порядка в гильбертовом пространстве.Актуальные проблемы математики и информационной технологии, материалы II Всероссийской конференции с международным участием,г.Махачкала , 5-7 февраля 2021 г., с.25-27.

2. Г.И.Асланов, Р.Ф.Гатамова . О корректной разрешимости одного класса операторно дифференциальных уравнений второго порядка с частными производными во всем пространстве. Актуальные проблемы математики и информационной технологии, материалы II Всероссийской конференции с международным участием,г.Махачкала , 5-7 февраля 2021 г.,с . 27-29.

8).work: "Direct problem of scattering for discontinuous coefficients Dirac equation on a semiaxis "

Ex: doct.ph.m.sc. prof. sen.res.as. H.M.Huseynov.

The existence and description of the Yost solution are given in the work, the properties of the nucleus are studied.

Papers

1. H.M.Huseynov. Self-adjont extensions for a class of singular operators.Turkish Journal of Mathematics (2021) 45,p.300-304.

2. H.M.Huseynov. On an inverse problem for the system of Dirak equations with discontinuity conditions on the whole axis.Proceedings of the Institute Mathematics and Mechanics , National Academy of sciences Azerbaijan.vol47 №2, 2021,p.340-345.

3. H.M.Huseynov. On the completeness of the systems Weber functions . Transactions National Academy of sciences Azerbaijan. ser. Phus.Tech. Mat.sci. vol 41(4), 2021 .p.78-82.

Abstract

4. H.M.Huseynov .Kəsilmə nöqtəsinə malik Şturm-Liuvill tənliyi üçün səpilmənin tərs məsələsi.Baki Biznes Universiteti.Ümumilli lider Heydər Əliyevin anadan olmasının 98 illiyinə həsr olunmuş elmi konfrans tezisləri.səh 239-240.Bakı 2021.

9).work: "Mandatory convergence of spectral expansions of functions from the Sobolev class in eigenfunctions of odd order differential operator." **Ex:**

doct.ph.m.sc. prof. sen.res.ass V.M.Kurbanov.

Paper

1.V.M. Kurbanov, R.I. Shahbazov, A.I. Ismailova. absolute and uniform convergence of the spectral expansion in the eigenfunctions of an odd order differential operator // Azerbaijan Journal of Mathematics, 2021, V. 11, No 1, pp. 169-188.

Abstract

1. Курбанов В.М., Исмаилова А.И. Оценка скорости равносходимости для одномерного оператора Шредингера с потенциалом из класса L_r , $r > 1$. // Современные методы теории краевых задач. Материалы Международной конференции. Воронежская весенняя математическая школа Понтрягинские чтения—XXXII, Посвящается памяти Александра Дмитриевича Баева (3–9 мая 2021 г). стр.158-160.

10).work: Reconstruction of a differential operator of the second order from the spectrum and sequence of signs "**Ex: doct.ph.m.sc prof. sen.res.as. I.M.Nabiyev.**

Paper

1. А. М. Гасанли, Л. И. Маммадова, И. М. Набиев. Единственность восстановления системы Дирака с полураспадающимися граничными условиями. Вестник БГУ, сер. физ.-матем., 2021, № 2. ст.36-43.
http://bsu.edu.az/az/content/bak_universitetinin_xbrlri_fizikariyaziyyat__seriyas

Conference materials

1.И.М. Набиев, Л.И. Маммадова, Ч.Г. Рзаева. Единственность решения обратной задачи для оператора Штурма-Лиувилля с полураспадающимися граничными условиями / XI Международная молодежная научно-практическая конференция «Математическое моделирование процессов и систем», 10 - 12 ноября 2021, г.ст. 163-165. Стерлитамак, г. Уфа.

Abstracts

1.Ibrahim Nabiev, Chinara Rzayeva. The inverse problem for the Sturm-Liouville operator with semi-separated boundary conditions/ International Black Sea coastline countries scientific research symposium – VI, Abstracts Book, April 28-30, 2021/ Giresun, Turkey, p. 161. https://b0699d12-70ad-4313-81f10833a431c01a.filesusr.com/ugd/614b1f_48f5b8178ff54d3fbf95686b97a4489c.pdf

2.Ibrahim Nabiev, Abid Ferzullazadeh. Reconstruction of the characteristic function of the boundary value problem of the Dirac operator in the form of an infinite product / 4th International E-Conference on Mathematical Advances and Applications, May 26-29, 2021, Istanbul / TURKEY, Abstract Book, p. 34.

https://2021.icomaas.com/wp-content/uploads/2021/05/ABSTRACT_BOOK_ICOMAA_2021.pdf

3.Ibrahim Nabiev, Guldane Mammedzadeh. Some spectral properties of the diffusion operator with a spectral parameter in the boundary condition / 4th International E-Conference on Mathematical Advances and Applications, May 26-29, 2021, Istanbul / TURKEY, Abstract Book, p. 107.

4.Ibrahim Nabiev, Leyla Mammadova. An Algorithm for Reconstructing the Sturm-Liouville Operator with a Spectral Parameter Square Including the Boundary Condition / 4th International E-Conference on Mathematical Advances and Applications, May 26-29, 2021, Istanbul / TURKEY, Abstract Book, p. 227.

https://2021.icomaas.com/wp-content/uploads/2021/05/ABSTRACT_BOOK_ICOMAA_2021.pdf

11). work:" Expantion of magnetic Schrödinger operator by eigenfunctions "
Ex: doct.ph.m.s. prof. sen.res.ass. A.R.Aliyev.

Papers

1. Алиев А. Р., Раджабов Ш. Ш. Разложение по собственным функциям магнитного оператора Шредингера в ограниченных областях // Вестник Томского государственного университета. Математика и механика, 2021, № 69, с. 5-14. http://journals.tsu.ru/mathematics/&journal_page=archive&id=2072 (Web of Science, Scopus)
2. Aliev A. R., Ismayilov E. A. Selection of the optimal class of features for recognition of the Azerbaijani handprinted characters // In: 11th World Conference on Intelligent Systems for Industrial Automation - WCIS-2020. Advances in Intelligent Systems and Computing, vol. 1323. Springer Nature Switzerland AG, 2021, p.p. 96-102. https://link.springer.com/chapter/10.1007/978-3-030-68004-6_12 (Web of Science, Scopus)
3. Aliev A. R., Manafov M. Dzh. Trace formula for a Sturm–Liouville operator with a δ' -interaction point // Differential Equations, 2021, vol. 57, no. 5, p.p. 563–569. <https://link.springer.com/article/10.1134/S0012266121050013> (Web of Science, Scopus)
4. Aliev A.R., Eyvazov E.H., Rajabov Sh.Sh. On estimation of the number of eigenvalues of the magnetic Schrödinger operator in a three-dimensional layer // Turkish Journal of Mathematics, 2021, vol. 45, no. 5, pp. 2260–2268. <https://journals.tubitak.gov.tr/math/issue.htm?id=7161> (Web of Science, Scopus).

12).work: "Special and addition of operator group in Hilbert space

about the multiplicity of elements. ” **Ex: cand.ph.m.sc. ass.prof. lead r.a.**
A.N.Jabrailova.

Papers

1.Джабраилова А.Н. О кратной полноте системы собственных и присоединенных элементов операторного пучка в гильбертовом пространстве. Научный журнал “CHRONOS”,2021, т.6 ,№ 2(52), стр.67-70.

2.Джабарзаде Р.М., Джабраилова А.Н. О разложении по собственным и присоединенным векторам двупараметрической системы операторов в гильбертовом пространстве. Евразийское Научное Объединение, 2021,№ 4(74), стр.13-16.

3.A. Jabrailova, J. Asadzadeh. On stability of bases from perturbed exponential systems in Orlicz spaces, Azerbaijan Journal of Mathematics, 2021, vol.11, №2 p.196-213

13).work: "Spectral properties of antiperiodic Sturm-Liouville problem with discontinuity divide the region". **Ex: cand.ph.m.s.ass prof. lead r.a.**
F.Sh.Mukhtarov.

Papers

1.F.S.Muhtarov, Serdar Paş, K.Aydemir. Spectral Properties of the Antiperiodik Boundary – Value-Transition Problems. Journal of New Theory.2021.ISSN2149-1402. Vol.11.no3.40-49.published 4.01.2021

2.F.S.Muhtarov., K.Aydemir.The Weak Eigenfunctions of Boundary-Value Problem with Symmetric Discontinuities. Has been accepted for publication and will appear in vol 28 of journal of Applied Analysis(2022)

14).work: "Inverse problems of spectral analysis for Bessel operator with a spectral parameter in the boundary condition" **cand.ph.m.s. lead.r.a. N.J.Guliyev.**

Over the past period, some inverse problems of spectral analysis have been investigated for the Bessel operator with spectral parameters in the boundary condition.

15).work: " Scattered problems for a system of first-order hyperbolic equations in special cases **Ex:c.ph.m.s.,chief. r.a. Alimardanova Kamilla A.**

Research on the topic was conducted during the reporting period. A work is prepared for the anchor.

16).work: "Direct and inverse problems of spectral analysis for a class of differential operators " **Ex:phd in math.,chief.r.a. Latifova Aygun R.**

The solution of a direct problem for a class of differential operators was studied, the construction of integral solutions, the properties of special functions, special numbers were studied.

17).work: "Inverse problem for Sheturm-Liouville operator in the form of Impedance". **Ex: phd in math.,chief. r.a. Osmanli Jalala A.**

In the reporting half-year, a link was found between the nucleus of the conversion operator and the scattering data.

18).work:" The scattering problem for a system of six hyperbolic equations on the semiaxis in the case of 2 incident and 4 scattered waves " **Ex: j.r.a. Safarova Aynur N.**

In this work, for six systems of hyperbolic equations, the problem of scattering in the form of two to four scattered waves coming from the hemisphere was studied.

Abstract

1.A.N.Safarova, A.A.Xudaverdieva. Об одной задаче с нелокальными условиями для одного уравнения третьего порядка. Azərbaycan xalqının ümumi lideri Heydər Əliyevin anadan olmasının 98-ci ildönümünə həsr

olunmuş , “Riyaziyyat, mexanika və onun tətbiqləri” adlı Respublika elmi konfransının materialları, səh. 183-184, Bakı, BDU 24-25 may 2021.

II. Scientific and organizational activities.

D. f-m. D., prof. GI Aslanov suggested teaching at BSU. He was appointed chairman of the State Examination Commission at BSU. He was a member of the Committee of the Republican Competition "Scientist of Tomorrow", organized by the Ministry of Education. Participated in academic councils as a member of the Defense Council. He is a member of the editorial committee of the journals "Transaction of NAS of Azerbaijan" and "Proceedings of the Institute of Mathematics and Mechanics". Scientific supervisor of three candidates for a degree.

D. f-m. Sci., prof., ch. n. with. I. M. Nabiev took part in 3 international conferences, was an opponent of 1 doctoral dissertation, published 3 scientific works. Was the chairman of the State. Attestation Commission in the Azerbaijan State. University of Petroleum and Industry (Master's degree)
Many employees of the department are engaged in teaching activities in various higher educational institutions of the Republic.

doct. ph.m.s.,prof.sen.r.a. S.A. Aliyev is a member of the editorial board of six scientific journals. Has supervised one ph.d. dissertation Engaged in pedagogical activity at BSU.

doct. ph.m.s.,prof.sen.r.a. A.R. Aliyev is an editor-in-chief of the international scientific journal “Azerbaijan Journal of High performance computing” (Azerbaijan), manager editor of the international scientific journal “Azerbaijan journal of Mathematics” and a member of the journals: «Proceedings of the Institute Mathematics and Mechanics, National Academy of Sciences of Azerbaijan» (Azərbaycan), «Transactions of Azerbaijan Institutes of Technology» (Azərbaycan).

doct. ph.m.s.,prof.sen.r.a. H.M. Huseynov is a member of editorial board of a lot of international and republican scientific journals. He is an adviser of magisters and doctoral students.

doct. ph.m.s.,prof.sen.r.a. S.S. Mirzoyev's two cand. for degrees have submitted their dissertation works to the Scientific Council of IMM.

doct. ph.m.s.,prof.sen.r.a. V.M. Gurbanov is a member of editorial board of a lot of international and republican scientific journals. He is an adviser of magisters and doctoral students.

Many of the department collaborators are engaged in pedagogical activity in different higher education institutions of the Republic.

PARTICIPATION IN SCIENTIFIC SEMINARS

All the collaborators have participated in the institute and department seminars.

PUBLISHED SCIENTIFIC PAPAERS

In the report period the employess of our department have published 20 papers, 10 abstracts, 2 proceedings of conference, 4 papers and 2 abstracts were submitted for publication. Of these, 14 articles have been published in journals included in the Web of Science and Scopus database.

Heard of department:

d.ph.m.s.prof. H.İ.Aslanov