

ON SCIENTIFIC AND SCIENTIFIC AND ORGANIZATIONAL ACTIVITIES OF THE DEPARTMENT "APPLIED MATHEMATICS" RMI ANAS BY 2022 REPORT

ABOUT SCIENTIFIC ACTIVITIES

The department employs 7 researchers, 1 chief laboratory assistant. There are 3 doctoral students and 1 doctoral student at the department.

During the reporting period, the department held 7 cases on two topics.

1. Modeling the movement of gas, liquid, gas-liquid mixture in the reservoir-well system.

2. Deformation of inhomogeneous structural elements, stability and application of composite materials.

In the reporting year, 6 articles and 5 theses were published. 2 articles and 1 monograph are accepted for publication. 2 of the scientific papers were published in journals indexed by the Web of Sciences, 3 by Thomson Reuters and 1 by Index Copernicus. There are 7 references to published articles.

Research work was carried out under the grant "Hydrodynamics of processes to improve the efficiency of sand control" in the project of the Science Fund of the State Oil Company of the Republic of Azerbaijan. Taking into account the manifestation of sand in the reservoir-well system, a model of hydrodynamics of fluid movement was built and boundary problems were solved. Based on the conducted studies, the influence of filters placed against the manifestation of sand on the performance of the well was determined. The results obtained were published in the form of an article. The duration of the project is from 05/01/2022 to 05/12/2022. The price is 55 thousand manats.

Topic: Modeling the movement of gas, liquid, gas-liquid mixture in the reservoir-well system

Work A: Modeling of non-stationary movement of a gas-liquid mixture in the reservoir-well system, taking into account heat transfer

d.s.m. Elkhan Abbasov

1. **E. M.Abbasov** "Gas Motion in Reservoir-Well System Subject to Heat Transfer", Journal of Engineering Thermophysics, 2022, vol. 31, №. 2, pp 283-298 ; (Thomson Reuters); [Q2](#)
2. **Е.М.Аббасов, Н.А.Агаева** «Моделирование движения газа в системе пласт-трубопровод», Национальная Академия Наук Беларуси

- Институт Тепло-и Массообмена им. А.В.Лыкова Инженерно-Физический Журнал (ИФЖ) 2022, iyul-avqust, том. 95, №. 4, с. 894-904; (Thomson Reuters) ; [Q2](#)
3. **Е.М.Аббасов, Г.Р.Агаева, Т.С.Кенгерли, А.О.Даришова** «Моделирование теплообменного процесса вытеснения нефти горячей водой в сопряженной системе пласт-скважина», Инженерно-Физический Журнал (ИФЖ) 2022, sentyabr-oktyabr, том. 95, №. 5, с. 1183-1189; (Thomson Reuters) ; [Q2](#)
 4. **Е.М. Abbasov, G.R.Agayeva, T.S.Kengerli, N.R. Abdullayeva** “Simulation of the Inference of Filter Operation Process on Oil and Gas Production Indicators” // Journal of Contemporary Applied Mathematics – ISSN: 2222-5498, p. 83-97, Volume 12, Issue 1, 2022.
 5. **Е.М. Abbasov** «Моделирование теплообменного процесса вытеснения нефти горячей водой в сопряженной системе пласт-скважина», “İstilikkeçirmə və kütlə mübadiləsi üzrə XVI Minsk Beynəlxalq Forum”u, 16 may - 19 may 2022-ci il, Minsk şəhəri (“Институт тепло и массообмена” имени А.В.Лыкова НАН Беларуси)
 6. **Е.М. Abbasov G.R.Agayeva N.R.Abdullaeva** “Model of non-stationary movement of gas-liquid mixture in the reservoir-well system, taking into account the heat exchange process”, Proseedings of the 8 th International Conference on Control and Optimization with Industrial Applications BAKU, Azerbaijan, June, 2022 (**Web of Science**)
 7. **Е.М. Abbasov N.A.Agayeva** “Movement of the gas-liquid mixture in the system of the reservoir-pipeline when connecting to the main line of the new source”, Akademik İbrahim İbrahimovun 110–illiyinə həsr olunmuş “Riyaziyyat və Mexanikanın Müasir Problemləri” adlı Beynəlxalq konfrans. 29 iyun-01 iyul, 2022- ci il, Bakı şəhəri

Cultural and educational events:

Elkhan Abbasov is a member of the Expert Council on Mathematics and Mechanics at the AAC. Supervises the preparation of 2 Doctors of Philosophy, 1 Doctor of Science doctoral students. Conducts master classes at RMI ANAS and Baku State University in the specialty of fluid, gas and plasma mechanics.

Work B: Modeling of non-stationary movement of gas-liquid mixture in the reservoir-well system

senior researcher Shusha Kerimova

1. **Sh.A.Kerimova**, “Analysis of changes in well pressure at different moments of time in pulsating cases of wellhead pressure values” //International Scientific Conference «Process Management and Scientific Developments», (Birmingham, United Kingdom). April 6, 2022, p.131-141

Topic: Problems of deformation, stability of inhomogeneous structural elements and the use of composite materials.

Case C: Dynamics of a layered polymer pipe reinforced with an elastic layer, taking into account the physico-chemical changes in its material

Phase: Dynamics of a polymer pipe reinforced with an elastic layer, taking into account the physical and chemical changes in its material

Doctor of Physics and Mathematics, prof. Gabil Aliyev

1. Алиев Г.Г., Алиев А.Г. «Прочность многослойной полимерной трубы с учетом изменения физико-механических свойств материала», EESJ-East European Science Journal, том 2-№ 11(75), декабрь 2021 г., (Польша-Варшава), ISSN 2468-5380, Импакт-фактор – 1,572, стр.68-77

2. Алиев Г.Г., Алиев А.Г. «Продольная вибрация стержня с изменяющейся массой при равномерном физическом и химическом изменении материала», EESJ-East European Science Journal (принято к публикации)

Case D: Application of Artificial Intelligence Theory to the Diagnosis of Poisoning by Toxic Substances

Stage: Research of fuzzy neural networks

Associate Professor Irada Mirzazade

1. **İrada Mirzezade** ”Intelligent information system of monitoring,diagnosis and prognosis of diseases in urgent therapy using carbon monoxide poisoning as an example” Riyaziyyat və Mexanikanın Müasir Problemləri Akademik İbrahim İbrahimovun 110 illik yubileyinə həsr olunan beynəlxalq elmi konfrans Bakı -2022, səh.149, 29 iyun-1 iyul.
2. **İrada Mirzezade** ”İntelleigent information system of monitoring,diagnosis and prognosis of diseases in urgent therapy:the case of carbon monoxide poisoning ” COİA 2022 Proceedings of the 8th International Conference on

Control and optimization with industrial applications Volume 2, 24-26 august,2022 Baku,Azerbaijan p. 345-347

- 3. İrada Mirzezade** “Artificial Intelligence In Problems Of Diagnostics And Of Acute Poisonings With Toxic Substances(Using An Example Of Differential Diagnosis Of Carbon Monoxide Poisonings) Lambert Akademic Publishing, 52 səh.

Case E: Investigation of solutions to basic boundary value problems for a transversely isotropic spherical shell

c.p.m.s. Fuad Huseynov

Case F: Ball Force Cracking in Round Discs of Variable Thickness

c.p.m.s.Elmaddin Shahbandiyev

- 1. Э.Г.Шахбандаев** «Устойчивость конструктивно ортотропной неоднородной цилиндрической оболочки от неравномерной радиальной нагрузки», Маşınşünaslıq, №1, 6 с., 2022

Case K: Vibrations of an inhomogeneous cylindrical plate in contact with a viscoelastic medium

junior researcher Movsumova Ayten

SCIENTIFIC AND ORGANIZATIONAL ACTIVITIES:

Elkhan Abbasov is a member of the Expert Council on Mathematics and Mechanics of the AAC under the President of the Republic of Azerbaijan, supervisor of 2 Ph.D. and 1 Ph.D. theses. 1 person defended a dissertation and received a Ph.D. degree in mechanics. He teaches hourly calculation to masters of the RMI of ANAS and Baku State University, specializing in fluid, gas and plasma mechanics, as well as mechanics of a deformable solid body.

Senior Research Fellow Glassy Karimova teaches 0.5 full-time at AzTU.

On the 2nd day of every week at 12:00 a seminar "Mechanics of Fluid, Gas and Deformable Solids" is held.

Head of department:

d.m.s. Elxan Abbasov