



Irik Z. Mukhametzyanov, PhD.

Date of Birth: 22 January 1959
Place of Birth: USSR (Russian Federation), Staro-Kuruchev Village, region Bashkortostan
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He is Doctor of Physics-Mathematical Sciences and Full Professor Ufa State Petroleum Technological University (USPTU), Faculty of General Scientific Disciplines.

Irik Z. Mukhametzyanov - One of the Leading Experts in Russia on Mathematical Modeling of the Structural Organization of Disperse Oil Systems.

The Scientific Interests in Recent Years is Mathematical Modeling and Optimization in Socio-Economic Systems: Design and Analysis of Multi-Agent Systems, Fuzzy Systems, Decision Support Systems; Multi-Criterial Decision-Making Models.

Irik Z. Mukhametzyanov developed new methods for normalization multi-dimensional data: ReS-algorithm, IZ-method (April, 17, 2018) and MS⁺-method (May, 02, 2019). The proposed methods eliminate the main problems in normalizing multidimensional data: transformation of measurement scales, asymmetry and shift of the range of normalized values that have not been solved in the last 50 years in research in the field of multi-criteria decision making and multi-dimensional classification.

Degree	Doctor of Physical and Mathematical Sciences
Year of award	2004
Affiliation	Ufa State Petroleum Technological University (USPTU),
Department	Faculty of General Scientific Disciplines, Department of Mathematics
Position	Professor
ORCID ID	0000-0001-8640-1654
Research Area	decision support systems, multi-criteria decision-making methods, multi-criteria optimization, fuzzy systems, fuzzy logic systems, optimization theory and operations research, mathematical modeling of social and economic processes, mathematical modeling of technical systems

EDUCATION

- 1976 to 1981 **BASHKIR STATE UNIVERSITY (BSU)** **UFA, Russia.**
Faculty of Mathematics, Department "Differential Equations"
- 1987 to 1989 **UFA STATE PETROLEUM TECHNOLOGICAL UNIVERSITY (USPTU)** **UFA, Russia.**
Postgraduate study at the USPTU on the specialty "Chemical technology of processing fuel and high-energy substances".
Ph. D thesis: "Structuring in the Liquid Phase and Phase Transition During the Thermolysis of Oil Residues" (USPTU, 1990).



- 2000 to 2004 The dissertation for the degree of Doctor of Physical and Mathematical Sciences:
"Structural organization of macromolecular associates in oil disperse systems"
(BASHKIR STATE UNIVERSITY, 2004)



Other Certificates

- 2001 **RUSSIAN CORRESPONDENCE FINANCIAL AND ECONOMIC INSTITUTE (VZFEI)** **UFA, Russia.**
1. "The Newest Computer Technologies for Forecasting Financial Indicators and Risks"
2. "Management of Financial and Banking Risks".
- 2004 **"MONTANUNIVERSITY"LEOBEN** **Leoben, Austria.**
"Scientific Exchange"

WORK EXPERIENCE AND EMPLOYMENT HISTORY

1981-1983	UFA STATE PETROLEUM TECHNOLOGICAL UNIVERSITY (USPTU) Assistant	Ufa, Russia.
1984-1986	ALL-UNION SCIENTIFIC RESEARCH INSTITUTE OF PETROLEUM ENGINEERING (VNIINEFTEMASH) Junior Researcher	Ufa, Russia.
1986 to present	UFA STATE PETROLEUM TECHNOLOGICAL UNIVERSITY (USPTU) Assistant, Senior Engineer, Graduate Student, Senior Lecturer, Associate Professor, Head of the Chair of Mathematical Modeling, Professor of the Department of Mathematics <u>Course teaching</u> <ul style="list-style-type: none">• Mathematical Modeling in Oil and Gas Problems• Mathematics• Probability Theory• Mathematical Statistics• Methods of Optimal Solutions• Econometrics• Statistical Soft for Experimental Data Analysis	Ufa, Russia.
2009-2010	UFA STATE ACADEMY OF ECONOMICS AND SERVICE (UGAES) Visiting Teacher <ul style="list-style-type: none">• Information and Communication Technologies in Business	Ufa, Russia

LIST of RESEARCH PUBLICATIONS

Total = 120

Books: 4; Tutorial: 24; International Journals: 3; National journals: 35; International
Conferences: 23; National Conferences: 30; Softwares: 7

RESEARCH ACTIVITIES AND PUBLICATION

Main scientific articles

1. Kuzeev I.R., Mukhametzyanov I.Z., Voronov V.G. (1990). Structure and kinetics of formation of small clusters in the process of irreversible growth. *J. Physical Chemistry*. 64(9), 2383-2387.

2. Mukhametzyanov I.Z. (1991). Viscosimetric studies of the aggregation of supramolecular formations of oil residues during thermolysis. *Colloid. Journal.* 53(3), 538-543.
3. Mukhametzyanov I.Z., Kuzeev I.R., Abizgyldin Yu.M. (1991). Macroscopic Structure of Oil Pitch during Hardening. *Colloid Journal.* 53(3), 503-508.
4. Mukhametzyanov I.Z., Kuzeev I.R. (1991). Fractal Structure of Oil Pitch Paramagnetic Aggregates. *Colloid Journal.* 53(4), 762-766.
5. Mukhametzyanov I.Z., Kuzeev I.R., Voronov V.G., Spivak S.I. (2002). Structural Organization of Petroleum Disperse Systems. *Doklady Physical Chemistry*, 387(1–3), 284–286.

Text Books (Books Published by Russian Publishers)

6. Mukhametzyanov, I.Z. (2003). *Structural organization of macromolecular associates in oil environments*. Moscow: Himija.
7. Mukhametzyanov, I.Z. (2006). Mathematical description of micro- and macro levels of a hierarchically interconnected continuum system. In Collective monograph under total. Ed. prof. S. Usmanov, *Inverse problems in applications* (pp. 173-185). Birk: BirGSPA.
8. Mukhametzyanov I.Z. (2010). *Optimization methods. Nonlinear Programming*. Ufa: USPTU.
9. Mukhametzyanov I.Z. (2015). *Methods of Optimal Solutions*. Ufa: USPTU.

Journals (from 2013, in Russian)

1. Zaynasheva, E. B., & Mukhametzyanov, I. Z. (2013). The model of interaction between competing firms and decision-making on the basis of the apparatus of fuzzy logic of furnaces. *Bulletin of the UGAES.* 3, 66-70.
2. Zaynasheva, E. B., & Mukhametzyanov, I. Z. (2013). Evaluation of Marketing Decisions in Terms of Fuzzy Market Information. *RISK: Resources, Information, Supply, Competition*, 2, 38-41.
3. Zaynasheva, E. B., & Mukhametzyanov, I. Z. (2013). The Information System of Making Marketing Decisions for a Multi-Agent Market Using Fuzzy Inferences. *Management of economic systems*, 8(56). URL: <http://uecs.ru/uecs56-562013/item/2293-opaoa-cca->
4. Tukaeva, Z. M., & Mukhametzyanov, I. Z. (2013). Predicting Performance of Clusters Based on Fuzzy Time Series. *RISK: Resources, Information, Supply, Competition (RU)*, 3, 239-243.
5. Tukaeva, Z. M., & Mukhametzyanov, I. Z. (2013). Model for Predicting Fuzzy Data for Solving Business Problems of Energy Companies. *Management of economic systems (RU)*, 8(56). URL: http://uecs.ru/index.php?option=com_flexicontent&view=items&id=2299

6. Mukhametzyanov, I. Z., & Meshalkin, V. P. (2014). Simulation Multiagent Fuzzy Logic Model for Industrial Companies Marketing Decision Making under Uncertainty. *Journal of Applied Informatics* (RU), 3(51), 100-109.
7. Mukhametzyanov, I. Z., & Meshalkin, V. P. (2014). Fuzzy-Logic Routine Forecasting the Development of Refineries Under Uncertainty. *Oil and Gas Business* (RU), 4, 126-133.
8. Mukhametzyanov, I. Z. & Meshalkin, V. P. (2015). The technique of hardware-computer rapid assessment of gas leaks in the split-type structural devices of the distribution systems of furnaces *Chemical industry today*, 5, 38-44.
9. Mukhametzyanov, I. Z. & Meshalkin, V. P. (2015). Improving the methodology of instrument-instrumental rapid assessment of gas leaks into the atmosphere during the operation of gas distribution systems (comments on the standard of the organization STO Gazprom 11-2005). *All materials. Encyclopaedic reference book. Appendix "Comments to standards, specifications, certificates"*, 4, 2-6.
10. Mukhametzyanov, I. Z. et. al. (2015). Methodical features of the application of stochastic indicators in the analysis of streaming data of natural or technical processes and objects of the furnace. *Electronic scientific journal "Oil and Gas Business"*. 2015. № 5. P. 446 - 492.
11. Mukhametzyanov, I. Z. et. al. (2015). Methodical maintenance of optimization of indicators of energy efficiency of modes of transportation of oil on the main pipelines of furnaces. *Transport and storage of oil products and hydrocarbon raw materials*. 4. 18-21.
12. Mukhametzyanov, I. Z. et. al. (2015). Monitoring of hydrate formation in natural gas production and transportation systems in cold climatic zones. *Oil and Gas Industry*. 4, 109-114.
13. Mukhametzyanov, I. Z. (2016). Identification of structure in computer simulation of clusters in petroleum disperse systems of furnaces. *Cybernetics and programming*. 3, 66-75. DOI: 10.7256 / 2306-4196.2016.3.19244. URL: http://e-notabene.ru/kp/article_19244.html
14. Mukhametzyanov, I. Z. (2016). Investigation of streaming data for self-similarity and large-scale invariance of furnaces. *Machinery engineering*. 4(100), 5-7.
15. Degtyarev, A.N., Mukhametzyanov, I. Z., & Rozhkova N.V. (2016). Methodology of Constructing the Hierarchical Structure of Development Indicators in the Sphere of Travel Business Based on Fuzzy-Logic Decision-Making Procedures. *Theoretical and Applied Economics* (RU), 1, 45-57. DOI: 10.7256/2409-8647.2016.1.19102 URL: http://e-notabene.ru/etc/article_19102.html
16. Mukhametzyanov, I. Z. (2017). Fuzzy Inference and Fuzzy AHP in Decision Support Systems: an Appendix to Assessing the Reliability of Technical Systems. *Cybernetics & Programming* (RU), 2, 59-77. DOI: 10.7256 / 2306-4196.2017.2.21794. URL: http://e-notabene.ru/kp/article_21794.html
17. Analysis of the sensitivity of solutions to MCDM problems: a statistical approach // *Decis. Mak. Appl. Manag. Eng.* 1 (2) (2018) 51-80.
18. A factor model for the development of car services in the region // *Management of economic systems: electronic scientific journal* (118) UEkS, 12/2018.

19. Prediction of the development of the sphere of regional car services (based on the materials of the Republic of Bashkortostan) // Service in Russia and abroad. V. 13, N. 1(83) 2019, P. 136-151.

Conferences

Total ≈ 50

International Conferences: ~23; National Conferences: ~28

Special/Guest Lectures/Keytone speeches delivered

1. *Multiagent Simulation Model and Fuzzy-Logical Decision-Making Tools in the Economy* //



International Scientific and Practical Conference MATHEMATICAL METHODS OF RESEARCH OF MODERN PROBLEMS IN ECONOMY AND SOCIETY, Ufa, Russian Federation, BSU, December 16-17, 2013.

2. *MCDM METODS: Sensitivity of Results in Variation of Estimations of Alternatives by*



Criteria // International Conference on Management, Engineering and Environment ICMNEE - 1 [Obrenovac], September 28-29, 2017. Beograd: RABEK and ECOR, 2017.p. 2-24 .

3. *Multi-criteria decision making methods: techniques and applications in logistics* //



International Scientific and Practical Conference "LOGISTICS AND ECONOMY OF RESOURCE SAVING AND ENERGY SAVING IN INDUSTRY" (MNPk "LEREP-11-2017") November 15-16, 2017, Russian Federation, Tula.



4. *A New Method for the Normalization of Multidimensional Data (IZ-Method) for MCDM Problems* // 25th International Conference on Multiple Criteria Decision Making (MCDM 2019), Contributed Session: Multiple Criteria Ranking and Sorting Methodology. Istanbul Technical University, Istanbul, Turkey from June 16th to June 21st, 2019.

Information systems / Software products

1. Simulation modeling of the evolution of cluster systems. (2003). Patent №2003612009. (RU).
2. The program complex "Optimization and resource-saving technologies for MN" (PC "Opti-REST"). 2011. Patent №2011619458. (RU).
3. Program for supporting the adoption of marketing solutions for a multi-agent system. (2013). Patent №2013618759. (RU).
4. Forecasting of fuzzy data for solving business problems of the fuel and energy sector enterprises. (2013). Patent №2013618857. (RU).
5. The program complex for analysis and calculation of indicators of stochastic processes. (2016). Patent №2016616236. (RU).

6. Software package for analyzing streaming data based on the Hearst indicator. (2017). Patent №2017617145. (RU).
7. Irik Z. Mukhametzyanov ©"IZ-norm method" of normalization the multidimensional data Claim: Text & Computer Program. Reg# TXu002125819 September 28, 2018, Library of Congress, United States Copyright Office, <https://copyright.gov/>

RESEARCH BUSINESS PROJECTS

	<i>Corporation</i>	<i>Name of the Project</i>	<i>Result</i>
1993-2000	Trust "Bashselektromontazh", Trust "Bashsantehmontazh", Trust "Ufagrazhdanstroy", "Trust 21"	Enterprise Resource Planning (ERP) System	<i>Softwares</i>
1996-1999	City Motor Transport Enterprises: UPAP-1, UPAP-2, UATP-6, Taxi Park №1 ...	A Corporate Management System for Passenger Transport and Motor Transport	<i>Softwares</i>
1996-2002	Scientific and Production Organizations: "Nemotazhdiagnostika", "Polymerconstruction", "Bashgiprobiosintez", "Project Institute Bashavtodor", etc.	A Corporate Management System for Design and Research and Production Organizations	<i>Softwares</i>
2009	ANK Bashneft - Project Manager	The decision of problems of optimization of application of methods of increase in oil recovery - a choice of the best variant on groups of objects of development.	<i>The method of grouping objects, choosing the best option ...</i>
2011	ANK Transneft. - Scientific Director	Analysis of technological regimes and formation of a plan for cyclic pumping.	<i>The methodology and calculation of rational for the value of specific energy consumption of pumping modes. Softwares</i>
2013	Gas-Service, Ufa. - Scientific Director	Estimation of the volume of technological losses of gas during its transportation by gas distribution networks.	<i>Technique for estimating technological losses of gas</i>

MEMBER, EDITORIAL BOARD

- 2017** Member of the Editorial Board Scientific journal "Decision Making: Applications in Management and Engineering"
Publishers: Regional Association for Security and crisis management (Serbia); European centre for operational research; Serbian OR Society, the Member of IFORS.

MEMBERSHIP IN SCIENTIFIC COMMUNITIES

- 2017** Member of the International Society on Multiple Criteria Decision Making
<https://www.mcdmsociety.org/>
- 2015** Member of the international community of users MatLab and Simulink (MathWorks)
<https://www.mathworks.com/matlabcentral/profile/authors/9911903-irik-mukhametzyanov>
- 2016** Member of the International Association for Scientific Interaction **ResearchGate**
https://www.researchgate.net/profile/Irik_Mukhametzyanov and **Academia**
<https://www.academia.edu/>

NUMBER of M.Tech. Theses

Guided: 55 diploma theses of the specialty "Mathematical Methods in Economics"

Number of PhD

Guided: 2 In progress: 2

Review/Opposition of DISSERTATIONS (PhD)

Preparation of the opinion of the leading organization (USPTU) on the thesis - 7
Reviews on the author's abstract of dissertations -15
Opposition of dissertations -5

EXPERT COMMISSIONS

- 2005 – 2010 • the Chairman of the State Attestation Commission in the MGUU M.A. Sholokhova (Ufa branch), majoring in Applied Mathematics
- 2008 – 2012 • the Chairman of the State Attestation Commission in the Bashkir State University, majoring in "Mathematical Methods in Economics".
- 2008 – 2012 • the Member of the Dissertational Board D-212.288.06 with USATU on specialty 05.13.18 - Mathematical modeling, numerical methods and program complexes

EXTRA – CURRICULAR (SOCIAL) ACTIVITIES

- 1996 – 2000 • the Chairman of the Trade Union of the Department of Mathematical Modeling
- 2000 – 2002 • the Chairman of the Trade Union Bureau of the Faculty of Economics and Management

- 2006 – 2010 • the Member of the Academic Council of the Institute of Economics, USPTU
2008 – 2014 • the Member of the Academic Council of USPTU

AWARDS

- 2008 • Certificate of Honor of the Ministry of Education of the Republic of Bashkortostan (RU)
2009 • Certificate of Honor of the Ufa State Oil Technical University (USPTU)
2014 • Certificate of Honor of the Ministry of Education and Science of the Russian Federation

REFERENCES

- <http://www.wiki02.ru/encyclopedia/>

IQ Test - 87,5% 😊

