International Scientific and Practical Conference
«INTELLIGENT INFORMATION TECHNOLOGIES AND MATHEMATICAL MODELLING 2024» (IIT&MM-2024)
Divnomorskoye, Gelendzhik
August 25 – 30, 2024

Day 1 – August 25, 2024
10:00 – 20:00: Arrival of participants.

Day 2 – August 26, 2024
9:00 – 9:30: Registration of conference participants (Lobby of the Large Conference Hall of the Student Health and Sports Complex "Raduga").

9:30 – 10:00: Official opening of the conference.

Welcome address by the co-chairs of the conference: Academician of the RAS B.N. Chetverushkin and Corresponding Member of the RAS A.I. Sukhinov.

Welcome addresses from the members of the program committee: Academician of the RAS A.A. Shananin, Corresponding Member of the RAS M.V. Yakobovsky, Doctor of Physical and Mathematical Sciences, Professor I.S. Nikitin, Corresponding Member of the NAS V.Sh. Melikyan, Doctor of Technical Sciences, Professor K.A. Tashev, Director of the Institute of Advanced Engineering "Rostselmash" V.A. Pigenko (Large Conference Hall of the Student Health and Sports Complex "Raduga").

10:00 – 10:15: Group photo.

10:15 – 10:30: Coffee break (Lobby of the Large Conference Hall of the Student Health and Sports Complex "Raduga").

PLENARY SESSION
Chair: Corresponding Member of the RAS A.I. Sukhinov
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

10:30 – 10:55: **Cauchy-Gelfand Problem and Inverse Problem for Quasilinear Conservation Law** – *Academician of the RAS Alexander Alekseevich Shananin*

10:55 – 11:00: Questions and discussion

11:00 – 11:25: **Supercomputer Applications: General Issues** – *Corresponding Member of the RAS Mikhail Vladimirovich Yakobovskiy (Co-author: Kornilina M. A.)*

11:25 – 11:30: Questions and discussion

11:30 – 11:55: **Mathematical Modeling of Fatigue Fracture Under High-Frequency Loading of SLM Materials** – *Doctor of Physical and Mathematical Sciences, Professor Ilya Stepanovich Nikitin (Co-authors: Nikitin A.D., Stratula B.A.)*

11:55 – 12:00: Questions and discussion

SECTION "MATHEMATICAL MODELING AND COMPUTATIONAL METHODS"
Chair: Corresponding Member of the RAS A.I. Sukhinov
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

12:00 – 12:10: **Mathematical Modeling of Physico-Chemical Processes in the Discontinuous Approximation** – *Sergey Ivanovich Martynenko* (Joint Institute for High Temperatures, RAS, Moscow)

12:10 – 12:15: Questions and discussion

12:15 – 12:25: **On Non-Stationary Problems of Heat and Mass Transfer During Pulsed Irradiation of a Target by an Electron Beam** – *Mikhail Adolfovich Stepovich, D.V. Turtin, E.V. Seregina, M.N. Filippov, V.V. Kalmanovich* (Kaluga State University named after K.E. Tsiolkovsky, Kaluga)

12:25 – 12:30: Questions and discussion

12:30 – 12:40: **Dynamics of Elastoviscoplastic Media with Softening** – *Vasily Ivanovich Golubev, I.S. Nikitin, A.V. Shevchenko* (Institute for Automation of Designing, RAS, Moscow)

12:40 – 12:45: Questions and discussion

12:45 – 12:55: **Modeling and Optimization of Chemical Processes Taking into Account Kinetics and Dynamics in Porous Media** – *Irek Marsovich Gubaidullin, K.F. Koledina* (Institute of Petrochemistry and Catalysis, Ufa Scientific Center of the RAS, Ufa)

12:55 – 13:00: Questions and discussion

13:00 – 13:10: **Mathematical Modeling of Species Formation Scenarios Considering Migration Effects** – *Alexander Vladimirovich Budyansky, V.G. Tsybulin*

13:10 – 13:15: Questions and discussion

13:15 – 13:25: **On Estimating the Mean Time to Failure in Non-Stationary Markov Models of Cyber Attacks** – *Adil Askarovich Kasenov*

13:25 – 13:30: Questions and discussion

13:30 – 13:40: **Mathematical Modeling of the Azov Sea Wave Surges Based on Remote Sensing Data** – *A.I. Sukhinov, Sofya Vladimirovna Protsenko, E.A. Protsenko, N.D. Panasenko*

13:40 – 13:45: Questions and discussion

13:45 – 14:30: Lunch (Cafeteria of the Student Health and Sports Complex "Raduga")

SECTION "MATHEMATICAL MODELING AND COMPUTATIONAL METHODS"
Chair: Academician of the RAS A.A. Shananin
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

14:30 – 14:40: **Mathematical Modeling of Saturation Transport for a Carbonate Reservoir in a Two-Dimensional Setting** – *Irek Marsovich Gubaidullin, R.M. Uzyanbaev, Yu.A. Poveschenko, Yu.O. Podryga, Bobreneva*

14:40 – 14:45: Questions and discussion

14:45 – 14:55: **Two Problems of Inter-Orbital Flights** – *Alexander Vasilyevich Bratishchev*

14:55 – 15:05: Questions and discussion

15:05 – 15:15: **Synergetic Equation In The Restricted Two-Body Problem** – *Alexey Vitalevich Zhivolup*

15:15 – 15:20: Questions and discussion

15:20 – 15:30: **Implementation of Operations Research Methods in Solving Optimization Problems Related to River Flooding** – *Denis Vadimovich Bondarenko, A.V. Nikitina*

15:30 – 15:35: Questions and discussion

15:35 – 15:45: **Mathematical Modeling of the Dynamic Regime of Oxidative Regeneration of a Catalyst Layer** – *Olga Sergeevna Yazovtseva*

15:45 – 15:50: Questions and discussion

15:50 – 16:00: **Joint Use of FEM in Dynamic Problems for Objects on Layered Foundations** – *S.G. Glushko, Alexander Alexandrovich Lyapin, B.V. Sobol*

16:00 – 16:05: Questions and discussion

16:05 – 16:15: **Choice of Algorithm for Solving Grid Equations in a Heterogeneous Computing Environment** – *Vladimir Nikolaevich Litvinov*

16:15 – 16:20: Questions and discussion

__16:20 – 16:35: Coffee break (Lobby of the Large Conference Hall of the Student Health and Sports Complex "Raduga").__

16:35 – 16:45: **Mathematical Modeling of Boundary Problems in the Diffusion Layer for the Steady-State Nernst-Planck Poisson Equations** – *Savva Andreevich Kovalenko, E.V. Kirillova, M.H. Urtenov*

16:45 – 16:50: Questions and discussion

16:50 – 17:00: **Numerical solution of the problem of multi-component sedriver transport based on an improved version of the alternate-triangular method with refined spectral estimates** –*Valentina Vladimirovna Sidoryakina*

17:00 – 17:05: Questions and discussion

17:05 – 17:15: **Forecasting the Dynamics Phytoplankton Species Based on Satellite Data Assimilation Method**s – *Yulia Valeryevna Belova, A.A. Filina, A.V. Nikitina, A.E. Chistyakov*

17:15 – 17:20: Questions and discussion

17:20 – 17:30: **Periodic Mixed Problems for Laplace and Elasticity Equations in a Wedge** – *Dmitry Alexandrovich Pozharsky, E.D. Pozharskaya, B.V. Sobol*

17:30 – 17:35: Questions and discussion

17:35 – 17:45: **Video Information Processing System for Identification of Microparticle Motion** – *Inna Yurievna Kuznetsova, Y.V. Belova, E.O. Rakhimbaeva*

17:45 – 17:50: Questions and discussion

17:50 – 18:00: **Method for Solving Grid Equations for Elongated Domains on a Multiprocessor Computing System** – *Asya Mikhailovna Atayan, Chistyakov A.E.*

18:00 – 18:05: Questions and discussion

18:05 – 18:15: **Coarse Segmentation of Pathological Lesion Boundaries in the Macular Area of the Human Retina with High Hyperreflectivity and Shielding of Underlying Structures** – *Viktor Alexandrovich Filippenko*

18:15 – 18:20: Questions and discussion

18:20 – 18:30 **Modeling of elements of the piezoelectric generator system** – *Alexander Vladimirovich Cherpakov*

18:30 – 18:35: Questions and discussion

__18:35 – 19:00 Dinner (Cafeteria of the Student Health and Sports Complex "Raduga")__

19:00: Free time

Day 3 – August 27, 2024

SECTION "INTELLECTUAL INFORMATION SYSTEMS AND TECHNOLOGIES"
Chair: Academician of the RAS M. V. Yakobovskiy
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

09:00 – 09:10 **Time series recognition using a piecewise constant model** – *Belyavsky Grigory Isaakovich, Shcherban I.V., Skrebtsov S.A.*

09:10 – 09:15 Questions and discussion

09:15 – 09:25 **Development of an intelligent recommendation system for a tourist club** – *Galina Borisovna Anisimova, M. A. Belousov*

09:25 – 09:30 Questions and discussion

09:30 – 09:40 **Lexical analyzer of Russian–language texts** – *Valery I. Shiyan*

09:40 – 09:45 Questions and discussion

09:45 – 09:55 **Identification of plankton populations in the surface waters of the Azov Sea based on neural network structures of various architectures** – *Sukhinov A.I., Sidoryakina V.V., Solomakha Denis Anatolyevich*

09:55 – 10:00 Questions and discussion

10:00 – 10:10 **Educational platform for learning Russian sign language** – *Sklyarenko Anna Anatolyevna, Posledov Yu.*

10:10 – 10:15 Questions and discussion

10:15 – 10:25 **Detection of microexpressions in a video sequence using optical flow** – *Nikita A. Mishin*

10:25 – 10:30 Questions and discussion

10:30 – 10:40 **Web Application for Effective Life Management Based on Artificial Intelligence Technologies** – *Sklyarenko Anna Anatolyevna, Shcherbina A.*

10:40 – 10:50 **Machine Learning Methods for Identifying and Classifying Images In Archaeological Artifacts** – *Alexandrov Alexander Alekseevich*

10:50 – 10:55 Questions and discussion

10:55 – 11:05 **The Development of a Software Module Designed To Recognize Cartographic Information** – *Rakhimbayeva E.O., Alyshov Tajaddin Aleddin ogly, Chistyakov A.E.*

11:05 – 11:10 Answers to questions and discussion

11:10 – 11:20 **Semantic segmentation of Earth remote sensing data** – *Irina Razveeva.Fedorovna, Rakhimbayeva E.O.*

11:20 – 11:25 Questions and discussion

11:25 – 11:40 Coffee break (hall of the Large conference hall of the student health and sports complex "Raduga").

SECTION "PROBLEMS OF STRENGTH IN MECHANICAL ENGINEERING PROBLEMS. MATHEMATICAL MODELING AND DIGITAL TECHNOLOGIES FOR CREATING PROMISING MODELS OF AGRICULTURAL MACHINERY (COMBINES, TRACTORS, LOADERS, ATTACHMENTS, ETC. "
Co-chairs: Doctor of Physical and Mathematical Sciences, Prof. Nikitin I.S.,
Director of IMP Rostselmash Pigenko V.A.
(Large conference hall of the Raduga Student Health and Sports Complex)

11:40 -11:50 **Application of mathematical modeling and digital technologies in the development of modern and promising machines in the agro–industry** – *Vladislav A. Pigenko*

11:50 – 11:55 Answers to questions and discussion

11:55 – 12:05 **Modeling and research of aerodynamic and regenerative properties of the recuperator/ Modeling and study of aerodynamic and regenerative properties of the recuperator** – *Andrey G. Okhotnikov*

12:05 – 12:10 Answers to questions and discussion

12:10 – 12:20 **Analysis of the stress-strain state of the parts of the three–point tractor suspension** – *Afanasyev Dmitry Mikhailovich*

12:20 – 12:25 Answers to questions and discussion

12:25 – 12:35 **Optimization of the design of a grain harvester for operating conditions along drainage channels using numerical analysis of durability** – *Kavalyan Onik Sarkisovich, Pigenko V.A.*

12:35 – 12:40 Answers to questions and discussion

SECTION "PROBLEMS OF TEACHING MATHEMATICAL DISCIPLINES, COMPUTER SCIENCE AND INFORMATION TECHNOLOGY AT THE UNIVERSITY. MODERN INFORMATION TECHNOLOGIES IN EDUCATION"

Chair: Doctor of Physical and Mathematical Sciences A.E. Chistyakov
(Large conference hall of the Raduga Student Health and Sports Complex)

12:40 – 12:50 **Fuzzy-Cognitive Modeling of the Influence of Media Technologies on the Quality of Education at a University** – *Sakharova Lyudmila Viktorovna, Vitchenko O.V., Kadomtsev M.I.*

12:50 – 12:55 Questions and discussion

12:55 – 13:05 **Theoretical model of the digital educational ecosystem in a modern university** – *Vitchenko O.V., Abramova Alexandra Igorevna, Sokovikova A.V.*

13:05 – 13:10 Questions and discussion

13:10 – 13:20 **Problems of application of information systems of programmed learning in preschool education** – *Gazizov Andrey Ravilevich, Gazizov E.R.*

13:20 – 13:25 Questions and discussion

13:25 – 14:30: Lunch (Canteen of the Raduga Student Health and sports complex).

14:30: Free time

Day 4 – August 28, 2024

SECTION "THEORY AND PRACTICE OF SOFTWARE DEVELOPMENT PROBLEMS OF COMPUTER AND INFORMATION SYSTEMS SECURITY "

Chair: Academician of the RAS M. V. Yakobovskiy
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

09:00 – 09:10 **The problems of modeling technical systems in space in terms of the concepts of "reliability", "survivability", "resilience"** – *Gazizov Andrey Ravilevich*

09:10 – 09:15 Questions and discussion

09:15 – 09:25 **Types of data normalization using the Bayesian method** – *Ganzhur Marina Alexandrovna*

09:25 – 09:30 Questions and discussion

09:30 – 09:40 **Development of information security methods for the testing system and online surveys at the driving school** – *Romanenko Marina Vitalievna, Trishchenko A.V.*

09:40 – 09:45 Questions and discussion

09:45 – 09:55 **The role of artificial intelligence in information security** – *Kovach Roman Yurievich, Simorin A.I.*

09:55 – 10:00 Questions and discussion

10:00 – 10:10 **Bayesian relationships in data normalization** – *Ganzhur, M.A., Dyachenko Nikita Vladimirovich, Kovach R.Yu*

10:10 – 10:15 Questions and discussion

10:15 – 10:25 **Detection and neutralization of DDoS cyberattacks of the Slowloris type using artificial intelligence** – *Katsai Artem Maksimovich*

10:25 – 10:30 Questions and discussion

10:30 – 10:40 **On the method of constructing three-dimensional models of closed spaces based on video data from a monocular camera of a mobile device** – *Dolgov Vasily Valeryevich, Makova V.*

10:40 – 10:45 Questions and discussion

10:45 – 13:00: Free time

__13:00 – 14:30: Lunch (Canteen of the Raduga Student Health and Sports complex).__

THE ROUND TABLE

Chair: Corresponding Member of the RAS A.I. Sukhinov
(Large Conference Hall of the Student Health and Sports Complex "Raduga")

14.30 - 16.15: **Round table: Digitalization and artificial intelligence in science. Organization of its safe use.**

__16:15 – 16:30: Coffee break (hall of the Large conference hall of the student health and sports complex "Raduga").__

16.30 – 18.00: Round table. The development of robotics in agriculture. Digital technologies: forecasts and prospects.

18:00 – 19:30: Free time

19:30 Closing ceremony of the conference (Canteen of the student health and sports complex "Raduga").

Day 5 – August 29, 2024
Free time.

Day 6 – August 30, 2024
9.00 – 14.00: Room check-in. Departure of the participants.

Link to the video meeting