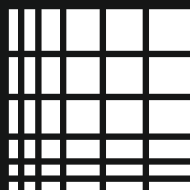




IEEE



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**PIERE**

Problems of Informatics,  
Electronics and Radio  
Engineering

## CONFERENCE PROGRAM

2<sup>nd</sup> International Conference «Problems of Informatics,  
Electronics and Radio Engineering (PIERE)»

**11-13<sup>TH</sup> NOVEMBER 2022**

**GMT+7**

**First Day – 11/11/2022**

9:00	Participants' Registration			
10:00	THE PIERE-2022 CONFERENCE OPENING, Hall 419			
10:30	Plenary session, Hall 419			
12:30	Lunch			
13:30	Sections Work:			
	Section «Mathematical modeling and machine learning», Hall 419	Section «Electron devices in industry, medicine, metrology», Hall 406	Section, «Digital signal processing and radio system modeling», Hall 417	Section «Automation and information systems», Hall 409
15:30	Break coffee			
16:00	Sections Work:			
	Section «Mathematical modeling and machine learning», Hall 419	Section «Electron devices in industry, medicine, metrology», Hall 406	Section, «Digital signal processing and radio system modeling», Hall 417	Section «Automation and information systems», Hall 409

**Second Day – 12/11/2022**

8:30	Participants' Registration			
9:00	Sections Work:			
10:00	Section «Antennas and radio frequency devices», Hall 419	Section «Electrical engineering and circuitry», Hall 406	Section «Digital energy management», Hall 417	Section «Automation and information systems», Hall 409
12:30	Lunch			
13:30	Sections Work:			
	Section «Antennas and radio frequency devices», Hall 419	Section «Electrical engineering and circuitry», Hall 406	Section «Digital energy management», Hall 417	Section «Automation and information systems», Hall 409
15:00	AWARD CEREMONY			
16:00	Reception			

Address: Prospekt Karla Marksa, 20 к8а, Novosibirsk

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- online report



# Plenary Session

November 11, 10:00, Hall 419

## Conference Opening Ceremony

Aleksey Vostretsov

Novosibirsk State Technical University

Sergey Brovanov

Novosibirsk State Technical University

1. **Semi-natural modeling and classical methods of radiotechnical measurements**

Aleksey Kiselev

Novosibirsk State Technical University

2. **About IEEE Russia-Siberia Section**

Grigoriy Khazankin

Industry Relations Coordinator

3. **Vacuum Semiconductor Spintronics: From Night Vision Devices to Free Electron Spin Detector**

Oleg Tereshchenko

A.V. Rzanov Institute of Semiconductor  
Physics

4. **The subject ontology of artificial intelligence**

Valeriy Khabarov

Novosibirsk State Technical University





# Section: Digital signal processing and radio system modeling

November 11, 13:30, Hall 417

Section Chair: Maksim Stepanov

Secretary: Andrei Nikulin

1. **The Digital Algorithm of Precision Estimation of the SIS-type Josephson Junction Critical Current**

Aleksey Vostretsov

Novosibirsk State Technical University

2. **Decomposition of an Antenna Array Focused at Several Space Points**

Denis Iuzvik

Novosibirsk State Technical University

3. **Features for Control Large Volume Cryochamber with Nonlinear Temperature Dependence of Heat Losses**

Mikhail Chupin

Kazan Federal University

4. **The Development of Methods for Estimating and Compensating Frequency and Time Offset in 6G DFT-s-OFDM Technology Communication Systems**

Linar Kataskin

Ufa State Aviation Technical University

5. **Digital Twin of the Seminatural Modeling Stand Based on a Matrix Simulator**

Daniil Bezruchenko

Novosibirsk State Technical University



**6. Obtaining Program Graphics of the Output Voltage and Investigation of Experimental Characteristics of the Logarithmic Detector**

Denis Chernysh

Novosibirsk State Technical University

**7. Change Bit-Depth Procedure for Data Measured Preprocessing before Compression**



Alexey Levenets

Pacific National University

**8. Direction Finding of Multipath Signals**



Maya Shevchenko

Saint Petersburg Electrotechnical University  
"LETI"

**9. Research of the M-sequence Autocorrelation Function Side Lobe Suppression Due to the Cyclic Accumulation**



Sergey Kislyy

National Research University of Electronic  
Technology (MIET)

**10. Automatic Frequency Control Technique in a Satellite Communication System with High Doppler to Bandwidth Ratio**



Ivan Pchenikin

National Research University of Electronic  
Technology (MIET)



# Section: Antennas and radio frequency devices

November 12, 9:00, Hall 419

Section Chair: Vladimir Razinkin

1. **Optimum Frequency Range for Remote Sensing of Soil Moisture with Various Texture, Density and Organic Matter Content**

Konstantin Muzalevskiy

Kirensky Institute of Physics

2. **Synthesizing of Ultra-Wide Band Impulse by means of a Log-Periodic Dipole Antenna. Case Study for a Radar Stand Experiment**

Konstantin Muzalevskiy

Kirensky Institute of Physics

3. **Printed Broadband Dipole Antenna**

Anatoly Razumikhin

Novosibirsk State Technical University

4. **Uncertainty Analysis of the Field Probe for Anechoic Chamber**

Ruslan Mosejchuk

Novosibirsk State Technical University

5. **A Nonlinear Model of Transmitarray and Reflectarray Unit Cells based on PIN diodes**

Vitalii Kirillov

Saint Petersburg Electrotechnical University  
«LETI»



**6. A Rotman Lens Based Wireless Power Transfer**

Irina Filipyuk

Saint Petersburg Electrotechnical University  
"LETI"

**7. The Analysis of the Influence of External Factors on the Measurement Error by Sensors based on the Effect of Stimulated Mandelstam–Brillouin Scattering**

Vladimir Karlin

Siberian State University of  
Telecommunications and Information Science

**8. Distributed Fiber-Optic Probing using the Optical Reflectometry Method**

Nicolay Gorlov

Siberian State University of  
Telecommunications and Computer Science

**9. The Printed Broadband Dividing-Summing Architecture for Multi-Port Amplifiers to Excite the S-Band Log-Periodic Satellite Antennas**

Andrey Kolesnikov

Novosibirsk State Technical University

**10. Printed Antenna with Center-End Feed Dipole-Like Radiator**

Andrey Kolesnikov

Novosibirsk State Technical University

**11. Analytical Models for the Time Response of a Modal Filter Having a Symmetrical Pair of Passive Conductors with Grounded Ends**

Indira Sagiyeva



Tomsk State University of Control Systems  
and Radioelectronics



**12. The Thermal Coefficients Influence on Parameters and Characteristics of Microstrip Line**



Indira Sagiyeva

Tomsk State University of Control Systems  
and Radioelectronics

**13. Self-matched Technologically Optimal Spiral Slot Antenna Covering C, X, Ku Bands**



Kirill Zeyde

Ural Federal University

**14. Digital Adaptation of the Phased Array Antenna Radiation Pattern in Interference Direction**



Maria Adushinova

Novosibirsk State Technical University

**15. Measuring Frequency Characteristic of PCBs with Modal Reservation under Climatic Impact**



Hasan Alhaj

Tomsk State University of Control Systems  
and Radioelectronics

**16. Demountable K/Q Band Coaxial Feed for Cassegrain Antenna**



Alexey Kantyshev

Kirensky Institute of Physics

**17. Microstrip Rejecting Bandstop Filter**



Ilya Govorun

Kirensky Institute of Physics



## **18. Analysis of Various Designs of Wideband Patch Antennas**

Mikhail Shishkin



Ural Federal University named after the first  
President of Russia B.N.Yeltsin

## **19. The Least Squares Method Application for the Two-Dimensional Interpolation in Radiation Pattern Measurements**

Aleksei Zavgorodnii



The Federal State Unitary Enterprise «Russian  
metrological institute of technical physics and  
radioengineering»

## **20. Multi-Band Compact Microstrip Antenna**

Evgenii Akashkin



National Research University of Electronic  
Technology



# Section: Electrical engineering and circuitry

November 12, 10:00, Hall 406

Section Chair: Sergey Brovanov

Secretary: Alexei Udovichenko

1. **Complex for Remote Execution of Laboratory Work on Radioelectronics**

Yuriy Davydov

Kazan Federal University

2. **Errors in Sensing High-Speed Thermal Radio Emission Processes with a Compensating Radiometer**

Artem Scheglyakov

Tomsk State University of Control Systems  
and Radioelectronics

3. **The 10 kW Autonomous Energy-efficient Power Supply System**

Ivan Bolshakov

Novosibirsk State Technical University

4. **AC Voltage Regulator with an Input Power Factor Equal to One**

Aleksey Udovichenko

Novosibirsk State Technical University

5. **Development of a Digital Data Measurement System for High-Voltage Networks**

Stanislav Ponomarev

Novosibirsk State Technical University



**6. Assessment of the Power Efficiency of a Multilevel Converter**

Aleksey Udovichenko

Novosibirsk State Technical University

**7. Integrated Voltage Harmonics Factors Estimation of Single-Phase Multilevel Voltage Source Inverter under Simple Quarter-Wave-Symmetric Space Vector PWM Control**

Nikolay Lopatkin

Shukshin Altai State University for Humanities  
and Pedagogy

**8. Resonant PI-Controller Design Based on the Time-Scale Separation Method for a Two-Level Voltage Inverter**

Oleg Vavilov

Novosibirsk State Technical University

**9. Image Classification by Neural Network on Crossbars with Memristor Defects**

Mikhail Tarkov



Rzhanov Institute of Semiconductor Physics  
SB RASB RAS

**10. Development of Weft Thread Projectile Accelerator Concept for Wearing Loom**

Semen Burmanov



Novosibirsk State Technical University

**11. Analysis of the Influence of the Inverter Electric Vehicle Charging Stations on the Quality of Consumer Power Supply in 10/0.4kV Electrical Networks**

Tatiana Myateg



Novosibirsk State Technical University





**12. The Circuit Technique for Reducing the Zero Level of the JFET Op-Amp on the Push-Pull Folded-Cascode**



Anna Bugakova

Don State Technical University

**13. Controllable RLC High-Frequency Filter with Resistive Tuning of Key Parameters**



Nikolay Butyrugin

Don State Technical University

**14. Sallen-Key Dual Channel Low-Pass Filter with Tunable Cutoff Frequency**



Nikolay Butyrugin

Don State Technical University

**15. Justification of STATCOM Systems Efficiency as an Objective of Improving the Quality of Electricity in a Mining Enterprise**



Artem Balabanov

Moscow Power Engineering Institute



# Section: Electronic devices in industry, medicine, metrology

November 11, 13:30, Hall 406

Section Chair: Yury Morozov

Secretary: Anna Kazmina

1. **Separation of Particular Energy Bands from the Bremsstrahlung Spectrum of a Pulsed X-ray Source for the Purpose of Dual-Energy X-ray Imaging**

Alexander Komarskiy

The Institute of Electrophysics of the Ural  
Division of the Russian Academy of Sciences

2. **Investigation of Parasitic Background IR Radiation Levels on a Photodetector Surface in a Vacuum Cryostat**

Pavel Aldokhin

Novosibirsk Branch of Rzhzanov Institute of  
Semiconductor Physics, Siberian Branch of the  
Russian Academy of Sciences, "Technology  
and Design Institute of Applied  
Microelectronics"

3. **Fabricatiopn Of Surface Grid By Method Interferential LCVD Nanolithography**

Dmitry Chesnokov

Siberian State University of Geosystems and  
Technologies

4. **Comparison of Skin Surface Stimulated Luminescence Spectra in Areas of Biologically Active and Neutral Zones Subject to External Ultraviolet Radiation**

Alexander Blokhin

Novosibirsk State Technical University



5. **Improved State Primary Special Standard for the Unit of Capacitance in the Frequency Range from 1 to 300 MHz GET 107-2019**

Alexander Shilov

The West Siberian Branch of All-Russian  
Scientific Research Institute for Physical-  
Engineering and Radiotechnical Metrology

6. **Complex Analysis of Voice: from Classifying Emotions to Detecting of Dysphonia**

Anastasia Nenko

Novosibirsk State Technical University

7. **Development of the Software and Hardware Complex "Polygraph" Based on Microcontroller Platforms, or "Polygraph - on the Knee"**

Igor Chudinov



Novosibirsk State Technical University

8. **Building a Predictive Model for the Diagnosis and Infertility Treatment**

Igor Chudinov



Novosibirsk State Technical University

9. **Obtaining an Array of Closely Packed Mesoscale Spheres Using Dielectrophoresis Forces for Optical Super-Resolution Microscopy**

Andrey Paulish



Novosibirsk State Technical University

10. **Development of an Electronic Toolkit for Body Condition Monitoring During Group Physical Education**

Dmitry Topolsky



South Ural State University



**11. Modification of the Integration-Differentiation Technique to Reduce the Reactive Power Measurement Error**

Andrey Serov



National Research University "Moscow Power Engineering Institute"

**12. Estimation of the Signal Parameters Measurement Error for the Case of ADC Nonlinearity Approximation by Chebyshev Polynomial**

Andrey Serov



National Research University "Moscow Power Engineering Institute"

**13. Nanoscale Waveguide Beam Splitter in Quantum Technologies**

Yuliana Tsykareva



Northern Arctic Federal University named after M.V. Lomonosov



# Section: Automation and information systems

November 11, 13:30, Hall 409

November 12, 10:00, Hall 409

Section Chair: Evgeny Rabinovich

Secretary: Daria Pinigina

## **FIRST DAY:**

- 1. Video system with automatic tracking of the object of interest**

Ilya Musikhin

Tomsk State University of Control Systems  
and Radioelectronics

- 2. Platform-independent SCADA and IoT Architecture Based on Metadata**

Eugene Romanov

Novosibirsk State Technical University

- 3. Description of Software for Comparative Analysis of Clustering Methods**

Diana Sidorova

Novosibirsk State Technical University

- 4. Development of Software for Automated Marking of Vertebral Bodies**

Dmitrii Piletskii

Novosibirsk State Technical University



5. **Development of a Web Application for Analyzing Sales of a Telecommunications Company Based on Data Mining Methods**

Elizaveta Khairulina

Novosibirsk State Technical University

6. **An Analysis of the Velocity Structure of the Lake Baikal Area Based on Numerical Modeling**

Daria Pinigina

Novosibirsk State Technical University

7. **The Phase Location of Reflected Seismic Pulses**

Evgeniy Rabinovich

Novosibirsk State Technical University

8. **Hardware-software Complex for Monitoring Incidental Losses Occurring in Optical Communication Cables under Mechanical Effect**

Perizat Madi



Abylkas Saginov Karaganda Technical  
University

9. **Backpass Trees for Modifying PathFinder-based Routing Algorithm for FPGA**

Alexander Chistiakov



Institute for Design Problems in  
Microelectronics of Russian Academy of  
Sciences

10. **Modeling of Light Transfer in Spatially Correlated Media for Functionally Specified Scenes**

Sergey Vyatkin



Institute of Automation and Electrometry of  
the Siberian Branch of the Russian Academy of  
Sciences



**11. Monitoring Information About International Conferences Using Natural Language Processing**



Igor Evchenko

National Research Nuclear University "MEPhI"  
(Moscow Engineering Physics Institute)

**12. Relative Gain Array Application for Typical Chemical Process**



Ivan Tsekhmestruk

National University of Oil and Gas «Gubkin  
University»

**13. Using Parallel Computing to Optimize Optical Anisotropy Detection Methods Using OpenCL Technology**



Igor Podojlov

Northern (Arctic) Federal University named  
after M.V. Lomonosov

**SECOND DAY:**

**1. Effects of Digital Eco-Therapy and Virtual Reality Immersion on Psycho-Emotional State in Different User Groups**

Maxim Bakaev

Novosibirsk State Technical University

**2. Computer Vision Based Assessment of University Websites' Accessibility and Inclusiveness**

Mikhail Grif

Novosibirsk State Technical University



3. **A Software Implementation and Research of Ensemble Algorithms for Solving the Different Types of Data Classification Problem**

Nikita Zelenchuk

Novosibirsk State Technical University

4. **Increasing the Spatial Resolution of Digital Holograms Based on the Fourier Transform**

Vladimir Guzhov

Novosibirsk State Technical University

5. **Forecasting Meteorological Indicators Based on Neural Networks**

Vladimir Kan

Novosibirsk State Technical University

6. **Platform Stabilization on a Ship under Wave Disturbances**

Tam Bui

Novosibirsk State Technical University

7. **Mathematical Model “Spine – Pelvis – Lower Extremities”**

Alexander Gladkov

Novosibirsk State Technical University

8. **The Algorithm for Controlling the Success of Induction Motor Starting in Small-scale Power Systems**

Ilya Dulov



Novosibirsk State Technical University

9. **Implementation of Social Media Data Collection Modules in Python**

Ivan Kalytyuk



Novosibirsk State Technical University





**10. Automatic Decomposition of a Sequential Algorithm for MapReduce Frameworks**



Victor Simonov

Novosibirsk State Technical University

**11. Open Pit Mine Production Scheduling using New Global Constraint**



Yurii Oleynik

Putilov Institute for Informatics and  
Mathematical Modeling – Subdivision of the  
Federal Research Centre «Kola Science Centre  
of the Russian Academy of Sciences»

**12. Information Storage and Retrieval System for a Molecular Dynamics Based Digital Twin of Materials**



Dmitry Topolsky

South Ural State University (national research  
university)

**13. Optimization of the UAVs Number in Emergency Communications Systems**



Grigory Voronkov

Ufa State Aviation Technical University

**14. Developing NLP Tool for Linguistic Analysis of Turkic Languages**



Davlatyor Mengliev

Urgench branch of Tashkent University of  
Information Technologies named after  
Muhammad Al-Khwarizmi



# Section: Mathematical modeling and machine learning

November 11, 13:30, Hall 419

Section Chair: Vladimir Timofeev

Secretary: Ekaterina Khailenko

1. **Improving GNSS Standard Positioning Service using Boosting Algorithms**

Vladislav Zhilinskiy

Federal State Unitary Enterprise "National  
Research Institute of Physicotechnical and  
Radio Engineering Measurements"

2. **Computer Modeling and Design the Virtual Lab "Electric Field" with a Real Prototype**

Anastasia Beloborodova

Novosibirsk State Technical University

3. **Comparative Analysis of Visualizing Methods for Multidimensional Data**

Nikita Oleinik

Novosibirsk State Technical University

4. **Analysis of the Properties of Mixed Method Discrete Analogues for Solving the Darcy Problem**

Svetlana Trofimova

Novosibirsk State Technical University



**5. Effective Properties of Frozen Soils of Different Cryogenic Structures**

Ekaterina Shtanko

Trofimuk Institute of Petroleum Geology and  
Geophysics of Siberian Branch Russian  
Academy of Sciences

**6. Numerical Simulation of the Time-domain Electromagnetic Field for Thaw Zone Detection**

Nadezhda Shtabel

Trofimuk Institute of Petroleum Geology and  
Geophysics of Siberian Branch Russian  
Academy of Sciences, Novosibirsk State  
Technical University

**7. Determination of the Thermal Conductivity of Gas-Hydrate-Containing Porous Media using Discrete Geometric Analogues**

Sergey Markov

Trofimuk Institute of Petroleum Geology and  
Geophysics of Siberian Branch Russian  
Academy of Sciences, Novosibirsk State  
Technical University

**8. Analysis of the Influence of Students' Identity on Academic Performance**



Natalya Pustovalova

Novosibirsk State Technical University

**9. Visual Word based Neural Tree for Interpretable Recognition of Images**



Roman Kozinets

Novosibirsk State University



**10. Computer Simulation of Dynamic Processes in Electronic Systems**

Konstantin Timofeev



Novosibirsk State Technical University

**11. Multi-Filament Triggering of Superfast HG PCSS**

Maksim Verkholetov



Tomsk State University

**12. Mathematical Modeling of the Scattering Spectra of Ultrashort Laser Pulses on a Multi-atomic Structure**

Anastasya Kharlamova



Northern (Arctic) Federal University named  
after M.V. Lomonosov

**13. Animal Movement Pattern Model Identification based on Detrended Fluctuation Analysis**

Asya Lyanova



Saint Petersburg Electrotechnical University  
"LETI"

**14. On the Analysis and Predictability of Long-Term Correlated Traffic Patterns in a Wide Area Network**

Evgeniy Beliakin



Saint-Petersburg Electrotechnical University

**15. Modeling and Analysis of Dynamic Data**

Behruz Saidov



South Ural State University



**16. Simulation of a Vibroacoustic Sensor with the Application of a Kalman Filter**



Parviz Shonazarov

South Ural State University

**17. Geological Mathematical Block Modelling in Kuzbass Mining Industry**



Arina Smirnova

T.F. Gorbachev Kuzbass State Technical  
University

**18. Elimination of Systematic Distortions in the Signals of LTI Systems using Test Measurements**



Andrey Novikov-Borodin

Institute for Nuclear Research of RAS

**19. Numerical Simulation of Permafrost Deformation**



Anastasiia Kutishcheva

Trofimuk Institute of Petroleum Geology and  
Geophysics of Siberian Branch Russian  
Academy of Sciences

**20. Numerical Methods for Mathematical Modeling of 3D Forward and Inverse Gravity Problem for Variable Density Model**



Tatyana Krikovtceva

Ural Federal University n. a. the first President  
of Russia B.N. Yeltsin

**21. The Advantage of Using e-Learning in Teaching Students Programming Languages**



Shohida Yusupova

Urgench branch of Tashkent University of  
Information Technologies named after  
Muhammad Al-Khwarizmi



# Section: Digital energy management

November 12, 10:00, Hall 417

Section Chair: Anastasia Rusina

Section Co-chair: Pavel Matrenin

Secretary: Ilya Litvinov

1. **Short-term Load Forecasting using Statistical Methods for the Central Power System of Mongolia**

Tuvshin Osgonbaatar

Novosibirsk State Technical University

2. **Analysis of the renewable energy sources application efficiency in the composition of autonomous hybrid power plants of railway transport electrification systems**

Sergey Mitrofanov

Novosibirsk State Technical University

3. **Innovative Solutions for Risks Management of Power Supply Disruptions to Oil Production Consumers**

Diana Boyarova

Novosibirsk State Technical University

4. **Machine Learning Methods in the Electric Power Industry**

Konstantin Kochmarev

Novosibirsk State Technical University

5. **Improving Generators Synchronization Methods Based on the Multifunctional System Implementation**

Viktoriya Fyodorova

Novosibirsk State Technical University



**6. Aggregation of Water-Energy Blocks of the Hydroelectric Power Plants Cascade Simulation Model**



Alena Sidorova

Novosibirsk State Technical University

**7. Improving fuel efficiency based on mini-CHPP**



Yana Frolova

Novosibirsk State Technical University

**8. Mobile Laboratory for Identification of Radial Distribution Network Topology**



Evgenii Zelenskii

North-Caucasian Federal University

**9. Analysis of Real Electrical Loads Obtained from Smart Electricity Meters Installed in Apartment Buildings in Moscow**



Vladimir Soluyanov

Kazan State Power Engineering University

**10. Electrical Load and Solar Generation Forecasting in Hybrid Energy Systems**



Vyacheslav Voronin

Kuzbass State Technical University named  
after T.F. Gorbachev

**11. Business Diversification of Coal Mining Enterprises Based on the Development of Coal Mine Methane Utilization Infrastructure**



Kirill Varnavskiy

T.F. Gorbachev Kuzbass State Technical  
University



## 12. The Basic of Electric Vehicle Charging Stations in Novosibirsk



Pavel Kazak

Novosibirsk State Technical University











