**November 17-19, 2022**

Tomsk State University of Control Systems and Radioelectronics

TUSUR UNIVERSITY

| Time | November 17, Thursday | |
|---|---|---|
| 9:30–10:00 | Registration of participants, Dom Uchenykh, Lobby | |
| 10:00–11:00 | **PLENARY OPEN SESSION**<br>Conference Hall, Dom Uchenykh | |
| 11:00–11:30 | Welcome Luncheon (Dom Uchenykh, Hall) | |
| | Track 1<br>Conference Hall<br><br>Topics:<br><br>Electron Devices<br>Sensors<br>Circuits<br>Communications<br>Software | Track 2<br>Small Hall<br><br>Topics:<br><br>Antennas and Propagation<br>Networks<br>Simulation<br>Internet of Things<br>Security<br>Control Systems |
| 11:30–12:30 | **Session 1** | **Session 1** |
| 12:30–14:00 | Lunch | |
| 14:00–15:30 | **Session 2** | **Session 2** |
| 15:30–16:00 | Break | |
| 16:00–18:00 | **Session 3** | **Session 3** |
| 18:30–21:00 | Get Together Party (Dom Uchenykh, Hall) | |
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| November 18, Friday | | |
| 9:30–10:35 | **Session 4** | **Session 4** |
| 10:35–11:00 | Break | |
| 11:00–12:30 | **Session 5** | **Session 5** |
| 12:30–13:30 | Lunch | |
| 13:30–15:00 | **Session 6** | **Session 6** |
| 15:00 | Social Program and Technical Tour | |

## Welcome Words from Conference Chair

As Chair of the International Siberian Conference on Control and Communications I would like to welcome you at Tomsk State University of Control Systems and Radioelectronics.

The SIBCON has a long tradition as a high-quality conference that covers all aspects of devices and technologies for control and communications. This Conference is organized in an effort to facilitate a deeper interaction among experts, designers, device technologists in order to support a deeper discussion of the challenges of system integration.

The past conferences were held in Tomsk, Krasnoyarsk, Omsk, Astana, Kazan, Moscow, each with a lot of participants. Following their success and based on suggestions from the Technical Program Committee members, this year the SIBCON has returned to Tomsk, a wonderful city with a unique legacy of history, science and culture.

An important part of the conference is its social side. Tomsk is popular Siberian city for traveling. We have planned some social events and a city tour for the participants. So I encourage you to explore Tomsk and get a taste of its rich history, culture and cuisine. I would like to join the entire SIBCON team in wishing you an enjoyable and productive stay in Tomsk.

The Conference is sponsored by the Tomsk IEEE Chapter and the IEEE Electron Devices Society ED-S. The ED-S celebrates 2022-2023 as the 75th Anniversary of the Transistor, so we have a special memorial session. I would like to express my deep appreciation to every contributor who helps hold the event to the highest international standard. My thanks go to the members of the Local Organization Committee – Vladimir Faerman, Alexander Medovnik, Inna Yarimova, Oleg Stukach for their excellent work in organizing this Conference. I have no doubt that their experience and advice that have gone into the SIBCON will lead the success of the Conference. I extend special gratitude to the subcommittee chairs, members and their affiliations of the International Program Committee. It is through their efforts that the SIBCON has received many submissions, and it is also with their contributions that the conference has succeeded in selecting the highest-quality papers. We take this opportunity to thank the Technical Program Committee members, the invited speakers, session organizers, session chairmen, reviewers, authors and sponsors in organizing such an event.

Finally, let me express the best wishes for success of the SIBCON, as well as for successes of the future SIBCON conferences in other regions and countries. I hope you enjoy this Conference and the friendships you make here, and hope you keep the Conference Proceedings in your library, which may be of use for you and your colleagues in your future research.

Welcome to SIBCON and welcome to Tomsk!

General Chair
Rector of TUSUR  V.M. Rulevskiy

## 75th Anniversary of the Transistor


November 1947 - January 1948 were the three magical months that paved the way for modern-day electronics. This was done by three brilliant scientists. The famous physicists - Walter Brattain and John Bardeen managed to make the first working transistor, now known as the point-contact transistor. The invention was made on December 16, 1947. A week after that, the device was officially demonstrated to Bell Labs executives as a "magnificent Christmas present." In January 1948, William Shockley demonstrated the junction transistor. All three received The Nobel Prize in Physics (1956).

The Electron Devices Society celebrates 2022-2023 as the 75th Anniversary of the Transistor. The bipolar junction transistor and light emitting diode are two innovations that have made a profound impact on the world. This shall be a mark of tribute to the men and women who have contributed to the Transistor Story - Discovery, Development, and Applications which has had a lasting impact on people's lives and has benefited mankind where it serves good in social relations, caring for the Earth, science, technology, engineering, and economy.

## Invitation

The 16th Siberian Conference SIBCON-2022 aims to offer opportunities to learn and to share information on the latest advances in communications, electron devices, and control systems. The conference is organized by the IEEE units in Siberia on a regular basis in order to promote interdisciplinary discussion and interaction among scientists and engineers with an emphasis on the IEEE membership. While the scientific program is expected to create stimulating professional interaction, the magic of Tomsk, hot spring atmosphere and wealth of historic wooden architecture promise a pleasant and memorable stay.

The conference will include plenary sessions with invited speakers, parallel thematic sessions with oral presentations, and a social program.

## Organized by

- Tomsk State University of Control Systems and Radioelectronics (TUSUR);
- Russia Siberia Section of the Institute of Electrical and Electronics Engineers;
- The Tomsk Chapter of the IEEE.

## Sponsors

- Keysight Technologies;
- MICRAN R&D";
- Systems. Technologies. Communications Ltd.

## Technical Sponsor

The IEEE Electron Devices Society (IEEE ED-S).

## Information Support

- Scientific and technical journal "Automatics & Software Enginery" www.jurnal.nips.ru;
- Scientific and technical journal " High-performance computing systems and technologies" journal.asu.ru/hpcst;
- Scientific journal "TUSUR Reports" journal.tusur.ru.

## Detailed Information

All registration information and hotel reservation forms, instructions for the preparation camera-ready paper etc. will be available in the second announcement at the Web sibcon.tusur.ru.

## Program Committee

Chair – Viktor M. Rulevskiy, Prof., Rector of TUSUR
Vice-Chair – Anton G. Loshilov, Vice-Rector for Research and Innovation
Chairmen of the International Program Committee – A.V. Medovnik, O.V. Stukach, V.A. Faerman

## Contacts

*Steering committee*
Secretary of the Organizing Committee
Inna A. Yarimova
TUSUR, Lenin Ave., 40, Tomsk, 634050
Tel: 8 (3822) 701-582 (ext. 1456)

*Proceedings and Special Sessions*
Vladimir A. Faerman, E-mail: fva@fb.tusur.ru

## Registration

Advance registration is performed through sending of full paper or paying of the registration fee. Final registration of participants will be held on sessions.

## Participation

To take part at the conference, it is necessary to send to Organizing Committee the full papers and to pay the registration fee. All participants of the conference should register at *http://sibcon.tusur.ru*

## Proceedings

All accepted papers will be published in conference Proceedings, registered in IEEE Xplore http://ieeexplore.ieee.org/ and indexed in scientific databases. The participants will be provided with the electronic version of the proceedings.

## Electronic Copyright Form (eCF)

Each author whose paper has been accepted for publication will receive email from IEEE regarding eCF (from copyrights@ieee.org with subject "Copyright Pending Notice for Article: ...title of your paper..."). This email will provide the authors with a link to the online eCF wizard, as well as a unique login name and password to access their own copyright forms. When an author completes the online copyright transfer process and submits the form, he/she will receive an automated confirmation email letting him/her know that the transfer has been completed successfully.

Please use the link in the email invitation sent earlier in order to access your eCF, and complete the entire form. If you have any difficulty accessing the eCF site, please contact the IPR Office at copyrights@ieee.org

## Banquet

Join us for the "Get Together Party" from 18:00 p.m. on the 17th of November in Dom Uchenykh. The dinner menu includes mini skewers, manty, mini cutlers, potato croquette, cold snacks, desert, wine and non-alcoholic beverages. There is no charge for the conference attendees.

## Technical Program

The technical program will cover all aspects of control and communications: theory, fundamental studies, and applied studies. It will include plenary session and thematic sessions composed of oral presentations. Contributed papers will be 7 minutes in length, with some minutes for discussion. Invited papers will be 20 minutes, with 5 minutes for discussion. Multimedia projector will be available.

## Sections

Antennas and Propagation
Control Systems
Circuits
Data Processing
Electron Devices
Internet of Things
Networks
Simulation
Sensors
Security
Software

## Plenary Open Session

- Greetings of the General Chair
- Greetings of the Technical Program Committee Chair
- Research and Education Activities of TUSUR
- Keynote papers

## Guidelines for Oral Presentations

Please note that the overall time available for your presentation is limited to 10 minutes of which 7 minutes are allowed for the actual presentation and 3 minutes for discussion. You should plan your presentation carefully. You should select your vocabulary to address as wide an audience as possible and avoid unfamiliar abbreviations or expressions.

Please remember that the responsibility of having your paper ready for Presentation at the scheduled time is primarily in your hands as the presenter. Check the readability, completeness and order of your slides before your presentation. Arrive well in advance of the session, and acquaint yourself with the operation of the podium and location of the equipment. Conference staff will be present to assist you. There are no scheduled breaks in the agenda so it is mandatory that the presentations be loaded before the beginning of each session.

Be careful to speak in accordance with the sequence of your slides. Avoid making major modifications to your transparencies during your presentation. Please stay within the time limit allocated for your presentation.

Technical equipments provided in the Conference room are:

- Multimedia video projector;
- Projection screen;
- Standard multimedia PC.

The operating system for session computers is Microsoft Windows 8. The available software is Microsoft Office 8 (or newer) that includes Word, Excel, PowerPoint, Adobe Acrobat Reader, and Windows Media Player. Therefore, all presentations must be compatible with this software. We suggest you to upload your presentation on a USB memory stick better than connecting your laptop.

## Transportation

All information about transportation you can receive via e-mail or telephones of the Organizing Committee.

Transport to the place of the conference: from railway station by bus N 2, 4, 442, 119; from Yuzhnzya Sq. by bus N 19, 22, 32; from the city center by bus N 2, 3, 4, 12, 19, 22, 23, 26, 32 to "Novo-Sobornaya" stop.

Tel. for information:

540730 - Bus Station

412466 - Air Ticket Office

541940, 541941 - Railway Station "Tomsk-1"

## Accommodation

"Tomsk", 65 Kirova Str.; tel. (3822)-524115. On the railway station square.

"Sputnik", 15 Belinskogo Str.; tel. (3822)-526660. By bus to "University" stop.

"Severnaya", 86 Lenin Ave.; tel. (3822)-512324. By bus to "TSUM" stop.

"Sibir", 91 Lenin Ave.; tel. (3822)-527225. By bus to "Glavpochtamt" stop.

**Keynote papers**

| **Plenary Session** Conference Hall, Dom Uchenykh | November 17, 10:15–11:00 |
|---|---|
| Spectral X-Ray Detectors Based on Multi-Element Chromium Compensated Gallium Arsenide Sensors and Application Specific Integrated Circuits | Anton Tyazhev |
| Nonlinear Baseband Pulse Radars: Possibilities and Trends | Edward Semyonov |

**Regular papers**

| **ID** | **Track 1** (Conference Hall) | November 17, 11:30–18:00 November 18, 9:30–15:00 |
|---|---|---|
| ed01av | Bipolar Reference Pulse Generation Device for Correlation Processing | Boris I. Avdochenko, Vladislav S. Pozdnyakov, Edward V. Semyonov, Evgenyi I. Trenkal |
| ed02da | GaAs pHEMT Traveling Wave Amplifiers up to 50 GHz | D.S. Danilov, A.V. Drozdov, T.M. Batoev, N.D. Malyutin |
| ed03dr | Evaluating the Level of Electromagnetic Interference Generated by the ESD Source in the TEM-Cell | Drozdova Anastasiya, Komnatnov Maxim |
| ed04ka | Development of Half-bridge IC with On-chip Drivers and Power e-HEMT Based on GaN-on-SOI Platform | Egor S. Polyntsev, Irina Y. Prokazina, Aleksandr I. Bartenev, Alina A. Sogomonyants, Valery A. Kagadey |
| ed05ki | Investigation of the Possibility of | Georgiy Kim, |

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| | Damped Sinusoid Decomposition in a Turn of a Meander Microstrip Line | Roman Surovtsev |
| ed06ko | Concept for Manufacturing a Microoptoelectromechanical Micro-G Accelerometer | Evgenij S. Barbin, Tamara G. Nesterenko, Aleksej N. Koleda, Evgeniy V. Shesterikov, Ivan V. Kulinich, Andrey Kokolov |
| ed07ku | Influence of Etching Time on Per-Unit-Length Parameters of Microstrip Lines | Kuzmin Nikita, Yevgeniy Zhechev |
| ed08ma | The Effect of Quasi-Chaotic Oscillations Formation in Devices Based on Strip Structures Containing Bulk LiNbO3 Crystals | Artush A. Arutyunyan, George A. Malyutin, Nickolay D. Malyutin |
| ed09ni | The Influence of the Dimensions of a Power Bus Bar with a Spiral Cross-Section on its Inductance and Capacitance | Nikolayev Ilya, Komnatnov Maxim, Gazizov Talgat |
| ed10ni | Means and Methods for Building-up the Linearity of Broadband Amplifiers | Pavel V. Sak, Galina V. Nikonova, Aleksandr V. Nikonov |
| ed11se | Susceptibility of Microcontrollers to Ultra-Short Pulse Electromagnetic Interferences under the Temperature Influence | Valeriy A. Semenyuk, Artem V. Osintsev, Maxim E. Komnatnov |
| ed12so | Compact Bandpass Waveguide Filters with Capacitive or Mixed Couplings with E plane Symmetry and without E plane Symmetry | Alexandr A. Sorkin |
| ed13ti | Low-Temperature JFET OpAmp Based On a Folded-Cascode with High Static Regime Symmetry of Transistors That Determine the Systematic Constituent of the | Vladislav Chumakov, Anna Bugakova, Alexey Titov |

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| | Offset-Voltage | |
| ed14ti | Circuitry of Micro-Power JFET and CMOS Input Differential Stages for Op-Amps on Silicon and Wide-Band Semiconductors | Vladislav Chumakov, Nikolay Prokopenko, Alexey Titov |
| ed15mi | Application of Sensors in the System of Shell Structures with Flexible Wearable Electronics | Marina V. Byrdina, Mikhail F. Mitsik, Igor M. Maltsev, Victoria S. Belysheva |
| cr02bi | The experimental circuits of D-mode GaAs pHEMT serial-to-parallel converter blocks | Dmitry V. Bilevich, Andrei S. Salnikov, Igor M. Dobush |
| sm09lu | Using the Method of Analogies in the Construction of a Scalable Low-Signal Model of a Switching HEMT | Danila A. Luzhaitsev, Artyom O. Turov, Yuri A. Miller, Dmitry S. Hohol, Elina O. Luzhaitseva |
| se02av | Investigation of Linear Hall-Effect Sensors Based on III–V Compounds at Pulsed Power Supply Mode | Geliia F. Karlova, Boris I. Avdochenko, Ekaterina A. Belozyorova |
| se03ba | Determination of the Complex Permittivity of a Liquid in the Ka Band from the Interference Dependence of the Reflection Coefficient on the Layer Thickness | Boris Basanov, Alexander Bazarov, Aryun Bazarova, Bair Garmaev, Evgeniy Korovin, Evgeniy Atutov |
| se04gu | Portable Analytical Device for Bedside Monitoring of the Functional State of the Hemostasis System | Dmitry Slizevich, Egor Zhukov, Fedor Gubarev |
| se05kh | Implementation of Ultrasonic Tomography of Scatterers Based on a Circular Array | Amoon Khalil |
| se06mo | Improving the Distance Measurement Accuracy of Active- | Aleksey A. Tislenko, Andrey K. Movchan, |

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| | Pulse Television Measuring Systems Using Polynomial Approximation | Viacheslav V. Kapustin |
| se07mo | Multi-Area Method of a Depth Map Building with Gain Modulation in Active-Pulse Television Measuring Systems | Andrey K. Movchan, Viacheslav V. Kapustin, Mikhail I. Kuryachiy, Elizaveta S. Movchan |
| se08sh | Errors in Sensing High-Speed Thermal Radio Emission Processes with a Compensating Radiometer | Anton V. Ubaychin, Artyom V. Scheglyakov, Tilekbek Abdirasul uulu, Denis V. Shchepin |
| cr02al | Measuring Frequency Characteristics of PCBs with Modal Reservation before and after Open Circuit Failure under Climatic Impact | Alhaj Hasan Adnan, Talgat R. Gazizov |
| cr03go | Optimization of Strip Modal Filters by Random Search Method | Viktoriya Gordeyeva, Anton Belousov |
| cr04mk | Prospect of Analyzing Integrated Circuits Based on Dataset with Synthesis Results | Ilya A. Mkrtchan, Dmitry V. Telpukhov, Alexander L. Stempkovsky |
| cr05mo | Hardware-Software Complex for Analysis and Diagnostics of Supercapacitors | Nikita Moskalenko, Ilya Kovkin, Yuriy Kremzukov |
| cr06ra | Manufacturing of Hybrid Integrated Circuits Using Additive Printer Technology | Natalia S. Trufanova, Sergey A. Artishchev, Anton G. Loschilov, Eldar R. Ragimov |
| cr07th | Features of Frequency Response Transformations of a RLC Circuits into Opposite Response at Using them as a Load of Coupled Strip Lines with Unequal Waves Phase | Trinh T. Thanh, George A. Malyutin, Anton. G. Loschilov |

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| | Velocities | |
| cr08zh | High-Speed Operational Amplifier with Differentiating Transient Correction Circuits | Nikolay N. Prokopenko, OlegV. Dvornikov, Alexey A. Zhuk |
| dt01bo | Application of Boolean Algebra Methods to the Problem of Measurement Data Compression | Ilya Bogachev, Alexey Levenets, En Un Chye, Vladislav Bondarenko |
| dt02bo | Transfer Training of a Neural Network to Improve the Efficiency of Automatic Recognition of Children Using NVIDIA Jetson Nano | German E. Edel, Natalia Borodina, Marina E. Sukotnova |
| dt03iv | Detection and Tracking of Sport Players on Videodata Using Deep Learning Methods | Leonid Ivanovsky, Dmitry Matveev, Vladimir Khryashchev, Alexander Semenov |
| dt04st | Improved Voice Activity Detector Based on Stacking Weak Classifiers | Anton Stefanidi, Andrey Priorov, Artem Topnikov, Ekaterina Sidorova |
| an04kh | Segmentation of Agricultural Fields on Microwave C-Band SAR Images | Vladimir Khryashchev, Roman Larionov, Nikita Kotov, Alexander Nazarovsky |
| dt07ku | Problems of Information Transmission Throughthe-Earth for the Implementation of an Emergency Communication Channel in the Direction "Mine-to-Surface" by Using Coded Seismoacoustic Signals | Kudinov Danil Sergeevich, Kohonkova Ekaterina Anatolievna, Potylitsyn Vadim Sergeevich |
| dt05sa | Extraction of the Envelope of Radio Impulse Signals Using the Digital Processing Methods Based on Correlation Function | Andrey Sagdiyev, Evgeniy Trenkal, Anton Loschilov, Vladislav |

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| | and Hilbert Transform | Pozdnyakov |
| dt06my | FPGA Hardware Implementation of the Yolo Subclass Convolutional Neural Network Model in Mobile Computer Vision Systems | Evgeniy A. Mytsko, Nikolay G. Markov, Ivan V. Zoev |
| st01ch | Selection and Research of Methods Increasing Optical Boundaries Determining Accuracy of Objects Suitable for Further FPGA Implementation | Yury A. Chursin, Ruslan A. Nurmukhametov |
| st02ku | Geoinformational approach to assessing the accessibility for urban areas | Aleksey V. Kurlov, Andrey V. Materuhin, Andrey V. Dresvyanin, Oleg G. Gvozdev |
| st03kv | Design of Expert System Elements for Solving Electromagnetic Compatibility Problems | Alexey A. Kvasnikov, Artem V. Osintsev, Sergey P. Kuksenko |
| st04la | System for Detecting Dynamic Objects on Video Sequence Frames | Vladislav Laptev, Olga Gerget, Nikita Laptev |
| st05va | Up-To-Date Libraries for Handwriting Recognition | Vladislav Vanyashin |
| st06tu | Open Source Library of Human Models for Gazebo Simulator | N. Tukhtamanov, E. Chebotareva, T. Tsoy, R. Lavrenov, M. Svinin, E. Magid |

| **ID** | **Track 2**<br>(Small Hall) | November 17,<br>11:30–18:00<br>November 18,<br>9:30–15:00 |
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| an01an | Frequency and Phase Responses of the Combined UWB antenna | Yury Andreev, Vyacheslav Plisko, Evgeny Balzovsky, |

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| | | Elizabeth Kuznetzova |
| an03ge | Ultra Wideband Compact Vavaldi Radiator with 3:1 Bandwidth | Armen V. Gevorkyan |
| an05po | Application of Twisted Radio Waves in a Polarization Radiolocation | Dmitry Ponamarev |
| an06sh | Application of the "TerraZond" Wide Coverage Georadar for Sounding the Roadbed | Sergey Shipilov, Ilya Tseplyaev, Rail Satarov, Dmitry Romanov |
| sm02av | Modeling of Complex Electrodynamic Objects Based on a Combined Approach | Igor Lvovich, Yakov Lvovich, Andrey Preobrazhenskiy, Yuriy Preobrazhenskiy, Tatyana Avetisyan |
| sm03dj | Room Frequency Response Equalization Using Modified X-Filtered Adaptive Algorithms | Victor Djigan |
| an02dj | Rectangular Partially Adaptive Antenna Array in Real-Valued Arithmetic | Victor Djigan |
| sm04le | Structure Generation of Recursive Digital Formers of Harmonic Signal Samples | Vladislav Lesnikov, Tatiana Naumovich, Alexander Chastikov |
| cs03le | Discretization of z-Plane Due to Quantization of Coefficients of IIR Allpass Filters | Vladislav Lesnikov, Tatiana Naumovich, Alexander Chastikov |
| sm05pa | Outage Probability of MIMO Communication System under the Influence of Correlated Phase Noise | Alexander Parshin, Yuri Parshin |
| sm06sa | Experimental study of the electrical characteristics of a modal filter on a double-sided | Maria A. Samoylichenko, Yevgeniy S. |

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| | PCB without an upper reference conductor | Zhechev, Talgat R. Gazizov |
| sm07sh | Improving the Radioelectronic Device Simulation Quality by Using a Step Recovery Diode | Gleb M. Shevchenko, Edward V. Semyonov |
| sm08vl | Four-Layer Reflection-Symmetric Structure in Common and Differential Modes | Vlasov Sergey, Yevgeniy Zhechev |
| sc01ba | Integrated Management Model of Distributed Information Systems in Conditions of Destructive Impact | Vladimir V. Baranov, Alexander A. Shelupanov |
| sc02me | Steganographic method of embedding data in images for transmission over a noisy communication channel | Elena Medvedeva, Igor Trubin, Denis Kuzminykh |
| sc03mi | Survey of Security Threat and Attack Scenario for Commercial UAVs | Elena Sergeevna Basan, Mikhailova Vasilisa Dmitrievna, Silin Oleg Igorevich, Lesnikov Alexander Alexandrovich, Mogilny Anton Bogdanovich |
| sc04sh | Exploring Security Testing Methods for Cyber-Physical Systems | Elena Basan, Vasilisa Mikhailova, Maria Shulika |
| sc05vl | Application of Blockchain Technology for Verification of State Documents in the Russian Federation | Mikhail V. Vladimirov, Pavel V. Senchenko, Anatoly A. Sidorov |
| sc06pr | Thermal Residue-Based Password Attacks and the Ways to Counteract the Same | Elizaveta A. Prozorova |
| sc07ko | Functional Modeling as a Basis for Classifying Security Threats | Anrton A. Konev |

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| sc08ba | Protection of Documented Information from Falsification Based on Speckle Patterns | D. P. Balandin, M. N. Osipov, R. N. Sergeev |
| sc09ba | Method for Selecting Indicators of Data Compromise | Vadim Kartak, Nail Bashmakov |
| sc10gr | Architecture of a Multistage Anomaly Detection System in Computer Networks | Mikhail Grekov |
| nt01br | Scheduling PD-NOMA with Round-Robin, Equal-Rate and Proportional-Fair Strategies | Andrey Brovkin, Yakov Kryukov, Dmitriy Pokamestov, Evgeniy Rogozhnikov, Georgiy Shalin, Artyom Shinkevich |
| nt02po | SCMA-LDPC coded communication system | Dmitriy Pokamestov, Georgiy Shalin, Artem Shinkevich, Eugeniy Rogozhnikov, Yakov Kryukov, Edgar Dmitriyev |
| nt03zh | Calculation of 5G Signal Attenuation on a Highway with Difficult Terrain and Mixed Forest | Vegera Denis Vladimirovich, Zhiba Grigoriy Vyacheslavovich, Novikova Agata Alekseevna |
| nt04pa | Estimating Data Transmission Range in a Wooded Area via the Lora Channel | Anton K. Pashchenko, Alexander A. Bombizov |
| nt05bu | Experimental Study of Sequential and Random Channel Hopping for Detecting Wi-Fi Access Points | Dmitry S. Burenok |
| io01ka | Assessment of the Quality of Brick Products by the Method of | Mikhail Kataev, Eugeny Kartashov, |

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| | Machine Vision | Roman Karpov |
| io02ka | UAV Image Analysis for Road Violation Detection | Mikhail Kataev, Eugeny Kartashov, Vladislav Avdeenko |
| io03ka | Image Processing Technique for Unmaned Motor Glider for Forest Fire Detection | Mikhail Kataev, Eugeny Kartashov |
| io04ts | Computer Attacks Simulation in IIoT Systems | Kirill Tsimbalov, Dmitry Bragin, Vitalii Moseichuk, Artur Mitsel |
| io05us | Problems of Building Infrastructure Vehicular ad hoc Networks Based on SD-WAN Technologies | Yuri Ushakov, Yuri Ushakov, Leonid Legashev |
| cs01ba | Laboratory Stand for Study Process Dynamics and Control | Roman Barashkin, Vladimir Popadko, Shokhrukh Abdivoitov |
| cs02kh | Application of geometric invariants in the problem of trajectory tracking for UAVs | Mikhail Khachumov |
| cs04ly | Subordinate Control System of Buck Converter | Danil Lyapunov, Sergey Lyapushkin, Anton Yudintsev |
| sm10ab | Door Handle Detection Modelling for Servosila Engineer Robot in Gazebo Simulator | Renat Abdulganeev, Roman Lavrenov, Ramil Safin, Yang Bai, Evgeni Magid |
| se01ar | Determination of the Steepness of the Discriminatory Characteristic for the Meter of non-Energy Parameters of the Signal | Vladimir Ivanovich Volovach, Vladimir Mikhaylovich Artyushenko |
| io06ly | ROS Network Security for a Swing Doors Automation in a Robotized Hospital | Sergey Lychko, Sergey Lychko, Hongbing Li, Edgar A. Mart´ınez-Garc´ıa, Evgeni |

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| | | Magid |
| sm01ar | Correlation Functions of the Noise Modulation Function under the Influence of Stationary and Slow Multiplicative Noise | Vladimir Ivanovich Volovach, Vladimir Mikhaylovich Artyushenko |
| sm11bu | Simulation of the Step-Down DC-DC converter with Si- and SiC-diodes | Nikita Yu. Burtsev, Olesya A. Kozhemyak |
| sm12li | Development of a Portable Indoor Air Analysis System | Nikita Y. Ligostaev, Stanislav N. Torgaev, Olesya A. Kozhemyak |
| io07su | A Review on Collaborative Robots in Industrial and Service Sectors | Ramir Sultanov, Shifa Sulaiman, Hongbing Li, Roman Meshcheryakov, Evgeni Magid |