International Conference Program

«2024 Systems of Signal Synchronization, Generating and Processing in Telecommunications»
SYNCHROINFO

IEEE Conference Record #61835

01 – 03 July, 2024

Vyborg, Russia, Zheleznodorozhnaya, 5
Hotel “Druzhba”

ORGANIZERS

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
RUSSIA SECTION ED/MTT/AES JOINT CHAPTER
RUSSIA SECTION CAS CHAPTER
INSTITUTE OF RADIO AND INFORMATION SYSTEMS (IRIS)

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Alexander V. Pestryakov: Doctor of Science (Engineering), Professor of Moscow Technical University of Communications and Informatics, Moscow, Russia

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Andrei V. Grebennikov: Ph.D., Sumitomo Electric Europe, UK, Senior Member, IEEE

Oleg G. Morozov: Doctor of Technical Sciences, Professor, Head of the Department of Radiophotonics and Microwave Technologies of KNRTU-KAI, Senior Member, IEEE

Artem S. Adzhemov: Doctor of Technical Sciences, Professor, Member, IEEE

CONFERENCE REGULATIONS

July 01 (Monday)

9:30 – 10:00
REGISTRATION OF PARTICIPANTS

10:00 – 11:40
PLENARY SESSION (*Большой конференц-зал*)

11:40
PHOTOGRAPHING

12:00 – 18:30
SECTION MEETINGS*

12:00 – 15:00 Section 3, Part I (*Большой конференц-зал*)

12:00 – 15:30 Section 4 (*Малый конференц-зал*)

15:30 – 18:30 Section 5 (*Малый конференц-зал*)

19:00 – 22:00
CONFERENCE BANQUET (*Ресторан отеля «Дружба»: Балтик-парк*)

July 02 (Tuesday)

10:00 – 19:00
SECTION MEETINGS*

10:00 – 14:30 Section 1 (*Большой конференц-зал*)

10:00 – 11:45 Section 2 (*Малый конференц-зал*)

11:45 – 15:30 Section 3, Part II (*Малый конференц-зал*)

15:30 – 19:00 Section 3, Part III (*Малый конференц-зал*)

July 03 (Wednesday)

EXCURSION PROGRAM
12:00 – 15:00

**Время выступления 12 минут (включая вопросы участников), в завершении каждой секции запланировано время на дискуссию*

JULY 01
PLENARY SESSION

10-00 : 10-10

OPENING SPEECH BY THE CHAIRMAN OF THE PROGRAM COMMITTEE

A.V. Pestryakov, *Chairman of the Organizing Committee, Doctor of Science (Engineering), Professor, Moscow Technical University of Communications and Informatics, Moscow, Russia*

10-10 : 10-20

PECULIARITIES AND RESULTS OF REVIEWING ARTICLES FOR THE PUBLICATION PROGRAM SINCHROINFO-2024

O.V. Varlamov, *Doctor of Technical Sciences, Professor, Chairman of Russia section CAS Chapter, Senior Member, IEEE*

10-20 : 10-45

Grigoriy Fokin, Konstantin Ryutin, Dmitriy Volgushev
The Bonch-Bruevich SPbSUT, Saint Petersburg, Russia
Alexander Komissarov, Vladimir Grigoriev
"Laboratory of Infocommunication Networks", Saint Petersburg, Russia

INTEGRATED COMMUNICATION, LOCALIZATION AND SYNCHRONIZATION IN COGNITIVE WIRELESS NETWORKS WITH SOFTWARE-DEFINED RADIO EXPERIMENTAL VALIDATION

10-45 : 11-10

Alexander Pastukh, Olga Mironova
Radio Research and Development Institute (NIIR), Moscow, Russia
Valery Tikhvinskiy
The International Information Technology University, Almaty, Kazakhstan
Vladislav Akhmediarov
Geyser-Telecom LLC, Moscow, Russia

ANALYSIS OF THE POSSIBILITY TO USE HYBRID SATELLITE-TERRESTRIAL SYSTEMS (DIRECT-TO-DEVICE) IN THE IMT BANDS OF TERRESTRIAL CELLULAR NETWORKS

11-10 : 11-35

SENSORY DIAGNOSTICS OF IONOSPHERIC AND TRANSIONOSPHERIC RADIO COMMUNICATION CHANNELS. METHODS AND EQUIPMENT OF THE VOLGA STATE UNIVERSITY OF TECHNOLOGY

D.V. Ivanov, V.A. Ivanov, N.V. Ryabova, R.R. Belgibaev, A.A. Kislitsyn, V.V. Ovchinnikov, M.I. Ryabova, A.A. Chernov, N.A. Konkin
Volga State University of Technology, Yoshkar-Ola, Russia

JULY 02

SECTION 1
Synchronization Systems and Devices

SECTION CHAIR

A.V. Pestryakov, *Chairman of the Program Committee,*
Doctor of Science (Engineering), Professor, Moscow Technical University of Communications and Informatics, Moscow, Russia

10:00 – 14:30

1. **T.Z. Dawood**
Moscow Technical University of Communications and Informatics, Moscow, Russia; Faculty of Mechanical and Electrical Engineering, Tishreen University, Lattakia, Syria
S.N. Stepanov, M.S. Stepanov, M.G. Kanishcheva, M.O. Shishkin
Moscow Technical University of Communications and Informatics, Moscow, Russia
THE ANALYSIS OF HETEROGENEOUS TRAFFIC SERVICING IN THE CELLULAR INTERNET OF THINGS ACCESS NODE

2. **V.A. Drogovoz**
Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Moscow, Russia
APPLICATION OF PETRI NETS TO ENSURE INTEROPERABILITY AND SYNCHRONIZATION OF ITS INDICATORS IN NETWORK-CENTRIC CONTROL SYSTEMS

3. **A.S. Fen, D.K. Mazurenko**
Research Institute of Radio, Moscow, Russia
M. L. Schwartz
Moscow Technical University of Communications and Informatics, Moscow, Russia
USING PREDICTION ALGORITHMS TO ADJUST THE FREQUENCY IN CASE OF AN INTERMITTENT SYNCHRONIZATION SIGNAL OR SWITCHING TO HOLDOVER MODE

4. **S.V. Kozlov**
Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences, Moscow, Russia
A.N. Kubankov
Moscow Technical University of Communications and Informatics, Moscow, Russia
PROCESS BASES FOR ENSURING INTEROPERABILITY AND SYNCHRONIZATION OF MULTIFUNCTIONAL NETWORK-CENTRIC SYSTEMS

5. **T.A. Kuzovkova, O.I. Sharavova**
Moscow Technical University of Communications and Informatics, Moscow, Russia
V.O. Tikhvinskiy
Radio Research and Development Institute, Moscow, Russia;
The International Information Technology University (IITU), Almaty, Kazakhstan
E.E. Devyatkin
Radio Research and Development Institute, Moscow, Russia
R.Yu. Umansky
Moscow Technical University of Communications and Informatics, Moscow, Russia
SYNERGY OF ARTIFICIAL INTELLIGENCE EFFICIENCY IN 5G MOBILE COMMUNICATION NETWORKS

6. **A.V. Len'shin, V.N. Tikhomirov**
Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia
N.M. Tikhomirov
Voronezh State Technical University, Voronezh, Russia
E.V. Shatalov
Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia
N.A. Fortunova
Bunin Yelets State University, Yelets, Russia
CALCULATION OF INTERFERENCE SPECTRUM IN FREQUENCY SYNTHESIZERS SPLIT MISMATCH CHARGING PUMP CURRENTS

7. **V. A. Lokhovin**
JSC "Centre for operation of space ground-based infrastructure", Moscow, Russia
A.V. Ryzhkov, M.L. Schwartz, V.M. Aladin
Moscow Technical University of Communications and Informatics, Moscow, Russia
COMMUNICATION & SYNCHRONIZATION SYSTEMS OF COMPLEX INFRASTRUCTURE FACILITIES. DIRECTIONS FOR FUTURE DEVELOPMENT

8. **E.O. Melikhov, E.P. Stroganova**
Moscow Technical University of Communications and Informatics, Moscow, Russia
INTELLIGENT MANAGEMENT OF COMBINED TRAFFIC IN PROMISING MOBILE COMMUNICATION NETWORKS

9. **Sergei Melnik**
Moscow Technical University of Communications and Informatics, Moscow, Russia
Elena Petrova, *Joint Stock Company TC DT, Moscow, Russia*
Vasily Vikulin, *Joint Stock Company KIA, Moscow, Russia*
DATA SYNCHRONIZATION FOR IMPLEMENTATION NEW TECHNOLOGY 5G/6G

10. **A.V. Ostroukh, C.B. Pronin, A.A. Podberezkin, J.V. Podberezkina, A.M. Volkov**
Moscow Automobile and Road State Technical University (MADI), Moscow, Russia
ENHANCING CORPORATE NETWORK SECURITY AND PERFORMANCE:
A COMPREHENSIVE EVALUATION OF WIREGUARD AS A NEXT-GENERATION VPN SOLUTION

11. **D.A. Paltsin, A.S. Fen, D.K. Mazurenko, A.V. Fedorov**
Research Institute of Radio, Moscow, Russia
SIMULATION MODELING OF OUTPUT CLOCKING SIGNAL PHASE DEVIATION DEPENDING ON THE POWER OF THE REFERENCE SYNC SIGNAL

12. **K.A. Panteleeva, A.A. Pervukhina**
Moscow Technical University of Communications and Informatics, Moscow, Russia
S.V. Shevelev
Moscow State University of Civil Engineering (National Research University), Moscow, Russia
D.V. Gadasin
Moscow Technical University of Communications and Informatics, Moscow, Russia
ACCIDENT PROCESS MANAGEMENT SYSTEM IN THE IT-LANDSCAPE AS A MEANS OF ENSURING THE STRUCTURAL RELIABILITY OF THE ORGANIZATION

13. **A.V. Pomogalova,** *The Bonch-Bruevich Saint-Petersburg State University of Telecommunications, Saint Petersburg, Russia*
E.A. Donskov, *St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, St. Petersburg, Russia*
V.S. Elagin, A.G. Vladyko *(Member, IEEE)*
The Bonch-Bruevich Saint-Petersburg State University of Telecommunications, Saint Petersburg, Russia
ASPECTS OF DATA TRANSFER AND SYNCHRONIZATION FOR VULNERABLE ROAD USERS EMERGENCY SCENARIOS BASED ON BLOCKCHAIN TECHNOLOGY IN ITS

14. **N.V. Pchelkina, D.D. Zhukovsky, A.K. Nanidzhanyan, E.Y. Bushuev, D.D. Chizhin**
Moscow Technical University of Communications and Informatics, Moscow, Russia
INVESTIGATION OF THE ATMOSPHERIC OPTICAL DISTURBANCES IMPACT ON THE FREE SPACE OPTICS QUANTUM KEY DISTRIBUTION

15. **J. Rabenandrasana, O.V. Kolesnikov, D.V. Bolotov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
O.S. Belova, A.G. Temnikov
National Research University "Moscow Power Engineering Institute", Moscow, Russia
THE EFFECT OF PULSED ELECTROMAGNETIC FIELDS ON THE TRANSMISSION OF INFORMATION OVER AN OPTICAL CABLE

16. **M. L. Schwartz, A. V. Ryzhkov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
E. A. Bogdanov, *JSC "United Energy Company", Moscow, Russia*
V. M. Aladin, *Moscow Technical University of Communications and Informatics, Moscow, Russia*
FEATURES OF TIME SCALES SYNCHRONIZATION IN ELECTRIC POWER COMMUNICATION NETWORKS

17. **V.A. Shevtsov,** *Moscow Aviation Institute, Moscow, Russia*
A.Yu. Perlov, A.M. Kazantsev, *National Research University of Electronic Technologies, Moscow, Russia*
S.V. Matseevich, *Lomonosov Moscow State University, Moscow, Russia*
A METHOD FOR DESIGNING A HETEROGENEOUS NETWORK OF A MONITORING SYSTEM BASED ON PREDICTIVE MODELING OF THE FUNCTIONING PROCESSES OF ITS SUBSYSTEMS

18. **O.I. Sheluhin, S.Y. Rybakov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
CHARACTERISTICS ASSESSMENT OF MULTIFRACTAL SPECTRUM OF FRACTAL DIMENSION IOT-TRAFFIC

19. **Elena Suvorova, Alexey Vinogradov**
Saint-Petersburg State University of Aerospace Instrumentation, Saint Petersburg, Russia
THE ARCHITECTURE OF SPACEFIBRE BRIDGES, WHICH PROVIDES THE ABILITY TO SYNCHRONIZE TIME BETWEEN DIFFERENT STANDARDS

20. **A.V. Timoshenko, A.Yu. Perlov, A.S. Zakharov, M.F. Bulatov**
Lomonosov Moscow State University, Moscow, Russia
I.V. Tyutin, *Long-Range Radar Research and Production Association, Moscow, Russia*
INCREASING THE ACCURACY CHARACTERISTICS OF THE SPACE MONITORING SYSTEM BASED ON INTELLIGENT CALIBRATION OF THE APAA RADIO INFORMATION SYSTEM

21. **S.D. Vu, A.V. Ermakova, S.F. Gorgadze**
Moscow Technical University of Communications and Informatics, Moscow, Russia
FAST SPECTRAL TRANSFORMATIONS IN THE TRUNCATED WALSH-HADAMARD BASIC AND SYNCHRONIZATION OF M-LIKE SEQUENCES

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22. **Sergey Erokhin, Andrey Petukhov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
Pavel Pilyugin, Sergey Litvinyuk, *Lomonosov Moscow State University, Moscow, Russia*
ASYMPTOTIC INFORMATION SECURITY MANAGEMENT FORMAL DESCRIPTION FOR CRITICAL INFORMATION INFRASTRUCTURE

23. **Grigoriy Fokin, Konstantin Ryutin**
The Bonch-Bruevich SPbSUT, Saint Petersburg, Russia
Alexander Komissarov, Vladimir Grigoriev
"Laboratory of Infocommunication Networks", Saint Petersburg, Russia
SOFTWARE-DEFINED RADIO NETWORK POSITIONING TECHNOLOGY DESIGN. SYNCHRONIZATION REFINEMENT

24. **Dmitriy Volgushev, Grigoriy Fokin**
The Bonch-Bruevich Saint Petersburg State University of Telecommunications, Saint Petersburg, Russia
INTEGRATED COMMUNICATION, LOCALIZATION, SENSING AND SYNCHRONIZATION IN 6G COGNITIVE WIRELESS NETWORKS

DISCUSSION & QUESTIONS

JULY 02

SECTION 2
Signal Generating and Shaping Devices

SECTION CHAIR

Oleg V. Varlamov, *Doctor of Technical Sciences, Professor, Chairman of Russia section CAS Chapter, Senior Member, IEEE*

10:00 – 11:45

1. **B.A. Ayukov, A.F. Kryachko, A.V. Medzigov, G.M. Revunov**
SUAI, Saint-Petersburg, Russia
ABOUT SCATTERING PROPERTIES OF AIRCRAFT ANTENNAS

2. **D.V. Kochemasov, N.N. Udalov**
National Research University MPEI, Moscow, Russia
STUDY OF THE INFLUENCE OF RF FILTERS IN THE SIGNAL CHANNEL OF A I/Q MODULATOR ON THE LEVEL OF SIDE COMPONENTS OF THE OUTPUT OSCILLATION SPECTRUM

3. **A.L. Makarevich, V.V. Kulachek, Yu.V. Zaharova, S.M. Sokovnich, S.V. Zinchenko**
Pridnestrovian State University named after T.G. Shevchenko, Tiraspol, Moldova
ANALYSIS OF THE STATE OF DEVELOPMENT OF THE COMPONENT BASE FOR QUANTUM DEVICES OF OPTICAL DATA TRANSMISSION SYSTEMS

4. **A.E. Mikenin, A.V. Pestryakov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
NOISE COMPENSATION LIMITS OF A LINEAR FREQUENCY SYNTHESIZER MODEL WITH A PLL SYSTEM WITH A FREQUENCY FEEDBACK LOOP

5. **G.A. Prokurat, A.E. Mikenin, A.V. Pestryakov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
MODULAR MODELING SOFTWARE IN THE RESEARCH AND DEVELOPMENT OF DIGITAL COMMUNICATION DEVICES

6. **A.S. Pshenichkin, A.E. Krupskaya**
PJSC "ALMAZ R&P Corp.", Moscow, Russia
K.N. Klimov
Moscow Aviation Institute, Moscow, Russia
DIGITAL PHASE CORRECTION SYSTEM OF SOLID-STATE MULTI-CHANNEL X-BAND RADAR TRANSMITTER THAT INCREASES POWER SUMMATION EFFICIENCY

7. **I.V. Ryabov, A.E. Makarov, N.O. Alekseev, T.S. Bukanova**
Volga State University of Technology, Yoshkar-Ola, Russia
HARDWARE-SOFTWARE RADIO COMPLEX FOR REMOTE SENSING OF THE EARTH'S ATMOSPHERE

9. **I.A. Tolkachev, E.V. Kontrosh, V.S. Kalinovsky, K.K. Prudchenko, G.V. Klimko**
Ioffe Institute, Saint-Petersburg
GENERATION OF BIPOLAR SUB-NANOSECOND PULSES BY A MODULE OF ALGAAS/GAAS P-I-N DIODES IN PHOTOVOLTAIC MODE

8. **F.D. Shusterman**
Russian Television and Radio Broadcasting Network, Moscow, Russia
O.V. Varlamov *(Senior Member, IEEE)*
Moscow Technical University of Communications and Informatics, Moscow, Russia
USE OF PANEL ANTENNAS WITH REDUCED REFLECTORS AND SLANT POLARIZATION AT VHF BROADCAST SITES

DISCUSSION & QUESTIONS

JULY 01

SECTION 3 (PART I)
Signal Processing Devices

CHAIR OF SECTION 3 (PART I)

Denis S. Chirov, *Doctor of Science (Engineering*), *Professor, Moscow Technical University of Communications and Informatics, Moscow, Russia*

12:00 – 15:00

1. **N.A. Andriyanov**
Financial University under the Government of the Russian Federation, Moscow, Russia
V.E. Dementyiev
Ulyanovsk State Technical University, Ulyanovsk, Russia
L. Gelifakis
University of Piraeus, Piraeus, Greece
ARCDEF IS LOSS FUNCTION FOR CRACKS CLASSIFICATION

2. **Ben Rejeb Sofien, Vitaly Kreyndelin**
Moscow Technical University of Communications and Informatics, Moscow, Russia
INVESTIGATION OF THE NOISE IMMUNITY OF VARIOUS VARIANTS OF THE MMSE ALGORITHM WHEN IMPLEMENTED ON A FIXED-POINT PROCESSOR

3. **Alexander Chastikov, Tatiana Naumovich, Vladislav Lesnikov**
Vyatka state university, Kirov, Russia
TAXONOMY OF SIGNAL SAMPLING SCHEMES

4. **D.S. Chirov, E.O. Kandaurova**
Moscow Technical University of Communications and Informatics, Moscow, Russia
RESEARCH OF BROADBAND SIGNALS FOR THE ORGANIZATION OF A COMMUNICATION CHANNEL WITH UAVS

5. **A.E. Denisov, D.P. Danilaev**
Kazan National Research Technical University named after A. N. Tupolev - KAI, Kazan, Russia
DYNAMIC RANGE OF A DIGITAL RADIO RECEIVER WITH A MICROWAVE PHOTONIC ELEMENT BASE

6. **A.M. Derakova, D.S. Shapkarin, A.I. Sattarova, K.Yu. Ryumshin, L.M. Kazadaev**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ANALYSIS OF NEURAL NETWORKS FOR SOLVING TELECOMMUNICATIONS PROBLEMS

7. **V.I. Djigan**
Institute for Design Problems in Microelectronics of RAS, Moscow, Russia
ALGORITHM OF SIGNAL SOURCE ANGULAR LOCATION SEARCHING AND TRACKING BY TWO-DIMENSIONAL RECTANGULAR ARRAY

8. **V.I. Djigan**
Institute for Design Problems in Microelectronics of RAS, Moscow, Russia
DECISION DIRECTED ADAPTIVE ANTENNA ARRAY FOR OPERATION IN LOW SNR CONDITIONS

9. **V.V. Dubrouski, H.I. Dulkevich**
Belarusian State Academy of Telecommunications, Minsk, Belarus
THE ALGORITHM OF NONLINEAR DATA CODING AND DECODING BY FIXED POINT TRANSFORMATIONS FOR SECURED MOBILE DIGITAL COMMUNICATION SYSTEMS

10. **L.N. Isaeva, A.V. Lobzov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
TESTING FEATURES OF THE LTE MOBILE COMMUNICATION RADIO EQUIPMENT UPON THE COMPLIANCE CONFIRMATION

11. **L.M. Kazadaev, A.I. Sattarova, K.Yu. Ryumshin**
Moscow Technical University of Communications and Informatics, Moscow, Russia
INVESTIGATION OF DIGITAL COMMUNICATION LINES NOISE IMMUNITY IN HYDROACOUSTIC CHANNEL USING VARIOUS TYPES OF PRODUCT TURBO CODE

12. **N.A. Kandaurov, V.I. Lipatkin, K.Y. Sokolov, V.O. Varlamov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
IMPLEMENTATION OF A TURBO-LIKE ERROR CORRECTION DECODER ON A GPU

13. **Vladislav Lesnikov, Tatiana Naumovich, Alexander Chastikov**
Vyatka state university, Kirov, Russia
ONTOLOGICAL APPROACH TO THE ANALYSIS OF SIGNAL SAMPLING THEOREMS

14. **V.O. Varlamov, E. O. Lobova, E. M. Lobov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ALGORITHM OF IONOSPHERIC CHANNEL DISPERSION CHARACTERISTIC SLOPE AND TRANSMISSION COEFFICIENTS JOINT OPTIMAL FILTERING

15. **I. A. Volkov, V. S. Priputin, E. A. Liberman**
Moscow Technical University of Communications and Informatics, Moscow, Russia
SUPPRESSION OF BANDPASS INTERFERENCE IN DIGITAL COMMUNICATION SYSTEMS WITH AN A PRIORI UNKNOWN TYPE OF MODULATION

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16. **Dmitry Ivanov, Vladimir Ivanov, Vladimir Ovchinnikov**
Volga State University of Technology, Yoshkar-Ola, Russia
ENHANCING COVERTNESS AND NOISE IMMUNITY OF NVIS HF COMMUNICATION SYSTEMS THROUGH ADAPTIVE DISPERSION CORRECTION USING CHANNEL SENSOR DATA

17. **D.V. Ivanov, V.A. Ivanov, N.V. Ryabova, R.R. Belgibaev**
Volga State University of Technology, Yoshkar-Ola, Russia
DEVELOPMENT OF AN ALGORITHM FOR ASSESSMENT OF PSD OF HF RADIO INTERFERENCE INCLUDING ANALYSIS OF DAILY AND SEASONAL VARIATIONS AND THEIR IMPACT ON CHANNEL AVAILABILITY

18. **A.A. Kislitsin, D.V. Ivanov, N.V. Ryabova**
Volga State University of Technology, Yoshkar-Ola, Russian
METHOD FOR AUTOMATED CONTROL OF FREQUENCY AND ENERGY RESOURCES IN WIDEBAND COMMUNICATIONS OVER DETERIORATING RADIO CHANNELS UNDER VARYING TRANSIONOSPHERIC PROPAGATION CONDITIONS

DISCUSSION & QUESTIONS

JULY 02

SECTION 3 (PART II)
Signal Processing Devices

CHAIR OF SECTION 3 (Part II)

Artem S. Adzhemov, *Doctor of Science (Engineering*), *Professor, Moscow Technical University of Communications and Informatics, Moscow, Russia, Member IEEE*

11:45 – 15:30

1. **A.S. Adzhemov** *(IEEE member)*, **S.A. Adzhemov, A.Y. Kudryashova**
Moscow Technical University of Communications and Informatics, Moscow, Russia
CONSTRUCTION OF A PRIMARY SOURCE CODE WITH GIVEN CODE DISTANCES BETWEEN ADJACENT CODE COMBINATIONS

2. **S.A. Adzhemov, A.S. Adzhemov** *(IEEE member)*, **A.Y. Kudryashova**
Moscow Technical University of Communications and Informatics, Moscow, Russia
FEATURES OF BIJECTION OF SPACES IN SIGNAL-CODE CONSTRUCTIONS

3. **V.B. Kreyndelin, E.D. Grigorieva**
Moscow Technical University of Communications and Informatics, Moscow, Russia
AN IMPLEMENTATION OF MMSE DEMODULATION ALGORITHM WITH REDUCED COMPUTATIONAL COMPLEXITY AND WITHOUT PERFORMANCE LOSS

4. **A.F. Kryachko, G.M. Revunov**
SUAI, Saint-Petersburg, Russia
MICROWAVE DIAGNOSTICS BASED ON AN OPEN RESONATOR

5. **A.N. Khairullin., I.M. Lerner**
Kazan National Research Technical University n.a. A.N. Tupolev - KAI, Kazan, Russia
I.V. Ryabov, *Volga State Technological University, Yoshkar-Ola, Russia*
V.I. Il'in, *Kazan Federal University, Kazan, Russia*
G.A. Garifullina, *Kazan National Research Technological University Kazan, Russia*
THE LOWER BOUNDARY CAPACITY ESTIMATION OF FREQUENCY SELECTIVE CHANNEL UTILIZING PAM-N-SIGNAL WITH INDEPENDENT AND IDENTICALLY DISTRIBUTED VALUES CHANNEL SYMBOLS
PART I. STANDARD PARTIAL SIGNALS

6. **I.M. Lerner, A.N. Khairullin, R.Kh. Rakhimov, Ya.F. Ziatdinova**
Kazan National Research Technical University n.a. A.N. Tupolev - KAI, Kazan, Russia
I.V. Ryabov
Volga State Technological University, Yoshkar-Ola, Russia
THE LOWER BOUNDARY CAPACITY ESTIMATION OF FREQUENCY SELECTIVE CHANNEL UTILIZING PAM-N-SIGNAL WITH INDEPENDENT AND IDENTICALLY DISTRIBUTED VALUES CHANNEL SYMBOLS
PART II. HYBRID PARTIAL SIGNALS

7. **A.V. Lobzov, L.N. Isaeva**
Moscow Technical University of Communications and Informatics, Moscow, Russia
S.S. Kogan
LLC «T8», St-Peterburg, Russia
CHANNEL PERFORMANCE CRITERIA IN OPTICAL TRANSPORT SYSTEMS WITH FORWARD ERROR CORRECTING CODES

8. **E.M. Lobov, A.D. Grigorieva, V.O. Varlamov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ON PROGRESSIVE EDGE GROWTH PARITY CHECK MATRIX GENERATION FOR NB-LDPC CODES IN HF COMMUNICATIONS

9. **I.V. Manonina, V.V. Shestakov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
USING WAVELET ANALYSIS FOR SIGNAL PROCESSING OF INFORMATION TRANSMISSION SYSTEMS

10. **V.Y. Mikhaylov, E.V. Vitomsky, R.B. Mazepa**
Moscow Aviation Institute (National Research University), Moscow, Russia
PROBLEMS OF SYNDROME DECODING OF BLOCK ERROR CORRECTION CODES

11. **O.G. Morozov** *(Senior IEEE member)***, R.M. Shagvaliev, D.S. Grabovetcky, T.R. Shagvaliev, L.M. Sarvarova**
Kazan National Research Technical University named after A.N. Tupolev-KAI, Kazan, Russia
Reference Sensor of Addressable Type for Qualitative and Quantitative Air Monitoring
PHYSICAL PRINCIPLES OF DESIGN AND MATHEMATICAL ANALYSIS

12. **Said Muratchaev, Alexander Bakhtin, Sergey Grigo, Damir Shaymardanov**
National Research University of Electronic Technology – MIET, Moscow, Russia
Gorelik Aleksandr
Russian University of Transport (MIIT), Moscow, Russia
DEVELOPMENT OF A DEVICE-BASED LAYOUT OF A MOBILE DECENTRALIZED NETWORK

13. **Ó. A. Mukhametzyanov, A.A. Veselova, S.R. Chukhanova**
Kazan National Research Technical University named after A. N. Tupolev - KAI, Kazan, Russia
PARABOLICAL INTEGRATION AS PARAMETER TO DETECT INFORMATIVE COMPONENTS OF ELECTRICAL HEART SIGNALS

14. **A.V. Nikonenko, A.A. Frolov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
OPERATING MODES OF MULTI-BEAM RADAR WITH POLARIZED RECEPTION FOR DETECTING SMALL UAVS

15. **Siarhei Palavenia, Aliaksei Salauyou, Anzhalika Karneyeva**
Belarusian State Academy of Telecommunications, Minsk, Belarus
Vadim Zahariev
BSUIR, Minsk, Belarus
RESEARCH ON THE ATMOSPHERIC CHANNEL FOR TRANSMITTING INFORMATION USING VISIBLE LIGHT

16. **R.M. Shagvaliev, O.G. Morozov** *(Senior IEEE member)***,**
D.S. Grabovetcky, T.R. Shagvaliev, L.M. Sarvarova
Kazan National Research Technical University named after A.N. Tupolev-KAI, Kazan, Russia
REFERENCE SENSOR OF ADDRESSABLE TYPE FOR QUALITATIVE AND QUANTITATIVE AIR MONITORING. SENSOR COMPONENTS DESIGN

17. **O.V. Vakulchik, V.Y. Mikhaylov, R.B. Mazepa**
Moscow Aviation Institute (National Research University), Moscow, Russia
DETECTION AND MONITORING OF PROCESSES THAT EXPLOIT THE CURSOR MECHANISM, PROVOKING LOCKS IN INFORMATION AND INFORMATION SEARCH SYSTEMS

18. **Alexey Volkov, Igor Sviridov**
National Research University of Electronic Technology, Moscow, Russia
CONSTRUCTION OF ALGEBRAIC CONVOLUTIONAL CODES BASED ON REED-SOLOMON GENERATOR POLYNOMIALS

DISCUSSION & QUESTIONS

JULY 02

SECTION 3 (PART III)
Signal Processing Devices

CHAIR OF SECTION 3 (Part III)

Anastasia Y. Kudryashova, *PhD, Moscow Technical University of Communications and Informatics, Moscow, Russia*

15:30 – 19:00

1. **N.P. Iampurin**
NNSTU named after R.E. Alekseev, Nizhny Novgorod, Russia
A.A. Krit, E.D. Korablev, V.I. Loginov, I.S. Fedosenko
Volga State University of Water Transport, Nizhny Novgorod, Russia
IMPLEMENTATION OF AN ENCODING SYSTEM WITH DYNAMIC KEY CHANGE BASED ON PSEUDORANDOM SEQUENCE GENERATORS

2. **I.A. Pestova, M.I. Kharitonov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
SUPPRESSIONS WI-FI SIGNALS AND WAYS TO COUNTER-ACT THEM

3. **N.E. Poborchaya, S.A. Zharkikh**
Moscow Technical University of Communications and Informatics, Moscow, Russia
SYNTHESIS OF AN ALGORITHM OF M-QAM SIGNAL ESTIMATION WITH LOGNORMAL NOISE

4. **S.A. Podobuev, A.A. Krylovich, A.N. Serov**
National Research University "Moscow Power Engineering Institute", Moscow, Russia
APPLICATION OF LEAST-SQUARES FOR FREQUENCY MEASUREMENT ERROR REDUCING FOR THE ZERO-CROSSING TECHNIQUE

5. **O.B. Popov, T.V. Chernysheva, D.A. Volchkov, K.V. Orlov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
RESEARCH AND CORRECTION OF DISTORTIONS WHEN CHANGING THE SAMPLING FREQUENCY IN THE RANGE OF TRANSMITTED LEVELS

6. **Sergey Portnoy, Nikitin Sergey**
National Research University "Higher School of Economics", Moscow, Russia;
The Moscow Institute of Electronics and Mathematics, Moscow, Russia
Andrey Tikhonyuk, *HT Consult LLC, Moscow, Russia*
Andrey Voloshin
National Research University "Higher School of Economics", Moscow, Russia;
The Moscow Institute of Electronics and Mathematics, Moscow, Russia
PERFORMANCE EVALUATION OF LDPC CODES IN 5G NR

7. **Andrey Reznev,** *NTC ATLAS, Moscow, Russia*
FASTER-THAN-NYQUIST SIGNALS FOR MODERN COMMUNICATION SYSTEMS

8. **M.M. Ryabchitsky, D.Ch. Tsoi, A.I. Sattarova, K.Yu. Ryumshin, L.M. Kazadaev**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ANALYSIS OF MULTIPLE ACCESS SYSTEMS NOISE IMMUNITY WITH VARIOUS TYPES OF MODULATION IN HYDROOPTICAL CHANNEL

9. **V.G. Sannikov, V.P. Volchkov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
IMPROVING THE QUALITY OF SPEECH SYNTHESIS BASED ON THE PHASE ROOTS OF THE PREDICTOR FILTER SYSTEM FUNCTION

10. **A.B. Sergienko, P.V. Apalina, A.D. Lebedinskaya**
Electrotechnical University "LETI", Saint Petersburg, Russia
FOURTH MOMENT-ASSISTED DEEP LEARNING-BASED CHANNEL STATE ESTIMATION FOR OFDM SYSTEMS

11. **A.N. Serov, K.A. Ivanenko, A.E. Evsenkina**
National Research University "Moscow Power Engineering Institute", Moscow, Russia
THE REACTIVE POWER MEASUREMENT METHOD OF HARMONICS BASED ON THE APPLICATION OF IIR FILTERS

12. **V.B. Shershenkov**
Peter the Great St.Petersburg Polytechnic University (SPbPU), St.Petersburg, Russia
HIGH-QUALITY GENERAL METHOD OF SUB-NYQUIST BANDPASS SAMPLING WITH SELECTED MINIMAL IN-BAND DISTORTION

13. **Dmitry Syrovetnik,** *Amungo LLC, Saint-Petersburg, Russia*
Yevgeniy Glushankov, *Bonch-Bruevich State University of Telecommunications, Saint-Petersburg, Russia*
Zahar Kondrashov, Dmitry Kirik, *JSC Progress MRI, Moscow, Russia*
STATIC COORDINATEOMETRY OF NEARBY SIGNAL SOURCES USING THE SUPER-RESOLUTION ALGORITHM MUSIC

14. **V.P. Volchkov, V.G. Sannikov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
PARAMETRIC SPECTRAL ANALYSIS BASED ON THE APPLICATION OF A TWO-WAY RECURSIVE MODEL WITH CONTROL

15. **S.L. Yablochnikov**
Moscow Technical University of Communications and Informatics, Moscow, Russia; Plekhanov Russian University of Economics, Moscow, Russia; Financial University under the Government of the Russian Federation, Moscow, Russia
V.B. Dzobelova
North Ossetian State University named after Kosta Levanovich Khetagurov, Vladikavkaz, Russia
I.O. Yablochnikova
Moscow Technical University of Communications and Informatics, Moscow, Russia; National University of Oil and Gas «Gubkin University», Moscow, Russia
L.V. Medvedeva
Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia
ASPECTS OF ASSESSING THE ABSOLUTE STABILITY OF CONTROL SYSTEMS CONTAINING NONLINEAR COMPONENTS

16. **I.O. Yablochnikova**
Moscow Technical University of Communications and Informatics, Moscow, Russia; National University of Oil and Gas «Gubkin University», Moscow, Russia
S.L. Yablochnikov
Moscow Technical University of Communications and Informatics, Moscow, Russia; Plekhanov Russian University of Economics, Moscow, Russia
V.B. Dzobelova
North Ossetian State University named after Kosta Levanovich Khetagurov, Vladikavkaz, Russia
S.D. Savostin
Moscow Technical University of Communications and Informatics, Moscow, Russia
ENSURING A GIVEN LEVEL OF CONTROL ACCURACY FOR SYSTEMS OF VARIOUS NATURE

17. **B.B. Borisenko, S.D. Erokhin, A.S. Fadeev**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ABOUT DETECTION OF COMPUTER ATTACKS USING CHANGE-POINT THEORY

18. **S.V. Kozlov, A.S. Kuznetsov**
Kazan National Research Technical University named after A. N. Tupolev-KAI, Kazan, Russian
DEVELOPMENT OF A METHOD FOR DETERMINING THE SIGNALS ARRIVAL TIMES OF SYSTEMS OPERATING IN THE INFORMATION FIELD

19. **Maxim Lavrov, E.I. Glushankov**
Bonch-Bruevich State University of Telecommunications, Saint-Petersburg, Russia
Zahar Kondrashov
JVC "NIIMA "PROGRESS", Saint-Petersburg, Russia
Evgenii Rylov
JSC "PCB "RIO", Saint-Petersburg, Russia
STUDY OF SIGNAL PROCESSING ALGORITHMS IN ANTENNA ARRAYS BASED ON HEURISTIC OPTIMIZATION METHODS

DISCUSSION & QUESTIONS

JULY 01

SECTION 4

«Problems of microwave electronics» them V.A. Solntsev

SECTION CHAIR

Andrey A. Yelizarov, *Doctor of Science (Engineering), Professor, National Research University Higher School of Economics, Moscow, Russia, Senior Member, IEEE*

12:00 – 15:30

1. **G.M. Aristarkhov, A.V. Markovskiy, A.D. Doronina**
Moscow Technical University of Communications and Informatics, Moscow, Russia
V.V. Kuvshinov
LLC NPP "FLIX", Moscow, Russia
WIDEBAND TWO-RESONATOR FILTERS WITH INCREASED WORKING ATTENUATION SLOPE AND EXTENDED STOP BAND

2. **S.V. Bashkevich, A.A. Yelizarov** *(Senior Member, IEEE)***,**
I.V. Nazarov, E.A. Zakirova, A.A. Skuridin
HSE University, Moscow, Russia
RESEARCH OF METAMATERIAL BASED ON T-SQUARE FRACTAL FOR RFID APPLICATIONS

3. **Tuan Phuong Dang, Adnan F. Alhaj Hasan, Talgat R. Gazizov**
Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia
MOM SCATTERING ANALYSIS OF DIHEDRAL CORNER REFLECTOR: TALGAT VERIFICATION

4. **Adnan F. Alhaj Hasan, Tuan Phuong Dang, Talgat R. Gazizov**
Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia
SCATTERING FROM A PERFECTLY CONDUCTING PLATE USING WIRE-GRID AND MOM WITH PULSE BASIS FUNCTIONS

5. **A.I. Katsnelson, D.S. Ilyanova, M.M. Kolpakov**
HSE University, Moscow, Russia
APPLICATION OF MIMO ANTENNAS IN WIRELESS ENERGY TRANSFER SYSTEMS FOR INTERNET OF THINGS

6. **I.N. Kirillov, G.M. Aristarkhov**
Moscow Technical University of Communications and Informatics, Moscow, Russia
V.V. Kuvshinov
LLC NPP "FLIX", Moscow, Russia
HIGHLY SELECTIVE MICROSTRIP FILTERS BASED ON THREE-RESONATOR STRUCTURES

7. **K.I. Konov, K.N. Klimov**
Moscow Aviation Institute (National Research University), Moscow, Russia
RADIATION PATTERN OF LAUNCH VEHICLE ONBOARD ANTENNA IN THE ACTIVE PART OF THE TRAJECTORY

8. **Alexander Kukharenko**
High School of Economics, Moscow, Russia
Ruslan Shaymardanov, Alexander Ivanov
General Microwave Co. LLC., Moscow, Russia
PATCH ANTENNA FOR NANO SATELLITE PLATFORM

9. **G.G. Makarushkin**
PJSC «ALMAZ R&P Corp.» LEMZ, Moscow, Russia
K.N. Klimov
Moscow Aviation Institute (National Research University), Moscow, Russia
USING THE ANSYS HFSS SOFTWARE PACKAGE FOR 3D NUMERICAL ELECTROMAGNETIC MODELING OF A FOUR-CHANNEL ANTENNA

10. **G.M. Minkovsky**
MT-INTEGRATION, LLC, Moscow, Russia
S.L. Portnoy, N.E. Sergey, N.S. Klyuev, R.Sh. Sakhautdinov
Higher School of Economics, Moscow Institute of Electronics and Mathematics (HSE MIEM), Moscow, Russia
MODELLING APPROACH TO CONVERGENCE TRACKSIDE RAILWAY NETWORKS

11. **Manh Tuan Nguyen, Adnan F. Alhaj Hasan, Talgat R. Gazizov**
Tomsk State University of Control Systems and Radioelectronics, Tomsk, Russia
COMPARATIVE ANALYSIS OF 5G PATCH ANTENNA SPARSE STRUCTURES CHARACTERISTICS AT DIFFERENT FREQUENCIES

12. **S.E. Nikitin, S.L. Portnoy, G.D. Antoshkin,** *Higher School of Economics; Institute of Electronics and Mathematics (HSE MIEM), Moscow, Russia*
METHODS OF WIRELESS CHANNEL MODELING BETWEEN BASE STATION AND MOVING TRAIN

13. **Ilia Peshkov,** *Bunin Yelets State University, Yelets, Russia*
SIMULATION OF A TWO-ELEMENT LOW-COMPLEXITY HYBRID ANTENNA ARRAY FOR DOA-ESTIMATION WITH INCREASED ACCURACY

14. **S.A. Presnyakov, A.D. Kasatkin, N.P. Kravchenko**
MIEM HSE, HSE University, Moscow, Russia
INVESTIGATION OF ELECTRODYNAMIC CHARACTERISTICS OF THE G- AND W-BANDS FOLDED WAVEGUIDE SLOW-WAVE STRUCTURE

15. **V.A. Skryabina**
HSE University, Electronic Engineering Department, Moscow, Russia
A.A.Yelizarov *(Senior IEEE Member)*
HSE University, Electronic Engineering Department, Moscow, Russia;
Moscow Technical University of Communications and Informatics, Moscow, Russia
S.V. Bashkevich
HSE University, Electronic Engineering Department, Moscow, Russia
V.N. Karavashkina, M.A. Mashkova
Moscow Technical University of Communications and Informatics, Moscow, Russia
SIMULATION OF A FRACTAL KOCH ANTENNA WITH A METAMATERIAL SURFACE

16. **E.I. Voronova,** *HSE University, Moscow, Russia*
A.A. Yelizarov *(Senior IEEE Member), HSE University, Moscow, Russia;*
Moscow Technical University of Communications and Informatics, Moscow, Russia
S.V. Bashkevich, *HSE University, Moscow, Russia*
V.N. Karavashkina, M.A. Mashkova
Moscow Technical University of Communications and Informatics, Moscow, Russia
SIMULATION OF A FRACTAL PEANO ANTENNA WITH A METAMATERIAL SURFACE

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17. **N.V. Barbasov,** *Graduate School SEC DSEA PJSC "Almaz R&P Corp.", Separate design bureau "LEMZ", Moscow, Russia*
A.S. Pshenichkin, *PJSC "Almaz R&P Corp.", Separate design bureau "LEMZ", Moscow, Russia*
ANALYSIS OF THE POSSIBILITY OF IMPROVING THE RELIABILITY OF RADAR STATIONS ON A WHEELED CHASSIS BY INTRODUCING VIBRATION PROTECTION

DISCUSSION & QUESTIONS

JULY 01

SECTION 5
Photonics and mathematics for moving objects

SECTION CHAIR

Marina Yashina, *Member, IEEE, Doctor of Science (Engineering), Professor, Moscow Automobile and Road Construction State Technical University (MADI), Moscow, Russia*

15:50 – 18:50

1. **S.E. Buznikov, A.M. Saykin, A.A. Serov**
FSUE "NAMI", Moscow, Russia
OPTIMIZATION OF DRIVING CONTROL TASKS DISTRIBUTION BETWEEN HIGHLY AUTOMATED VEHICLES AND INTELLIGENT TRANSPORT SYSTEMS

2. **V.V. Filatov**
State University of Management, Moscow, Russia
I.S. Nefelov
Moscow Automobile and Road University, Moscow, Russia
V.-A. V. Badakova, D.A. Yudin
State University of Management, Moscow, Russia
CREATION OF DIGITAL TWINS OF AGRICULTURAL MACHINE PARTS USING ENGINEERING TECHNOLOGY

3. **A. O. Glazkov, A.V. Kolesnikov, G.G. Nadareishvili, A.A. Predein, S.I. Yudin**
FSUE "NAMI", Moscow, Russia
CALCULATED AND EXPERIMENTAL ANALYSIS ACOUSTIC EFFICIENCY OF VEHICLE EXHAUST SYSTEMS

4. **Mikhail Gorodnichev, Kamil Kharrasov, Marina Moseva**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ON THE COLOR TRANSFORMATION PROBLEM BASED ON GENERATIVE-ADVERSARIAL NETWORKS

5. **Ivan Kuteynikov**
Moscow Automobile and Road State Technical University (MADI), Moscow, Russia; Moscow Technical University of Communications and Informatics, Moscow, Russia
Marina Yashina
Moscow Automobile and Road State Technical University (MADI), Moscow, Russia; Moscow Technical University of Communications and Informatics, Moscow, Russia; Moscow Aviation Institute (National Research University), Moscow, Russia
COMPUTATIONAL COMPLEXITY OPTIMIZATION OF VEHICLE VIDEO-RECOGNITION ALGORITHM USING THE VIRTUAL DETECTORS METHOD

6. **Anastasiia Lipatova, Mikhail Gorodnichev, Kirill Shishkin, Marina Moseva**
Moscow Technical University of Communications and Informatics, Moscow, Russia
ON THE TASK OF DEVELOPING ALGORITHMS FOR GENERATING SYNTHETIC DATA FOR TESTING INTELLIGENT TRANSPORTATION SYSTEMS

7. **I.S. Nefelov**
State University of Management, Moscow, Russia;
Moscow Automobile and Road University, Moscow, Russia
V.V. Filatov, V.-A. V. Badakova
State University of Management, Moscow, Russia
A.S.Eremin
Gubkin Russian State University of Oil and Gas, Moscow, Russia
COMPARATIVE ANALYSIS OF ERRORS IN 3D SCANNING OF GAUGE BLOCKS DEPENDING ON THE MATTING LAYER AND TOOLS FOR PROCESSING POLYGONAL MODELS

8. **Sergey Simonov, Marina Moseva, Mikhail Gorodnichev**
Moscow Technical University of Communications and Informatics, Moscow, Russia
A MATHEMATICAL SOFTWARE OF THE ELECTRIC MOTOR OPERATION OF DATA GENERATION ABOUT CONDITION

9. **M.A. Trapeznikova, A.A. Chechina, and N.G. Churbanova**
Keldysh Institute of Applied Mathematics of Russian Academy of Sciences (KIAM RAS), Moscow, Russia
NUMERICAL INVESTIGATION OF TRAFFIC ON A HIGHWAY WITH VARYING NUMBER OF LANES

10. **A.M. Valuev**
Mechanical Engineering Research Institute named after A.A. Blagonravov of RAS, Moscow, Russia
MODEL OF STOCHASTIC TRAFFIC FLOW THROUGH AN INTERSECTION WITH REPRESENTATION OF CLUSTER INTERACTION

11. **M.V. Yashina**
MADI, Moscow, Russia;
NAMI, Moscow, Russia;
Moscow Technical University of Communications and Informatics, Moscow, Russia
V.B. Yashin
MADI, Moscow, Russia
V.V. Evgrafov
NAMI, Moscow, Russia
A.G. Tatashev
MADI, Moscow, Russia
QUEUEING SYSTEM WITH PRIORITY BANDWIDTH SHARING DISCIPLINE FOR V2X TECHNOLOGY

12. **Sergei Zuev, Dmitry Prokhorov**
MIREA - Russian Technological University, Moscow, Russia;
FSUE " NAMI ", Moscow, Russia
Ruslan Maleev
Moscow Polytechnic University, Moscow, Russia
Artem Timoshenko, Anatoly Ermoshin
FSUE " NAMI ", Moscow, Russia
ANALYSIS OF FREQUENCY-CONTROLLED ASYNCHRONOUS MOTOR PARAMETERS IN ELECTRIC VEHICLE ELECTRIC DRIVE CONTROL SYSTEMS

DISCUSSION & QUESTIONS