

6th International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency



SUMMA2024 CONFERENCE PROGRAM

November, 13-15, 2024 | Russia, Lipetsk



SUMMA2024 CONFERENCE

The 6th International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency (SUMMA2024) focuses on the wide range of topics related to Control Systems and Mathematical Modeling, Automation and using advanced knowledge in the Power Industry to solve scientific and practical production problems. Traditionally the conference is jointly organized by V.A. Trapeznikov Institute of Control Sciences RAS and the Institute Computer Sciences of Lipetsk State Technical University.

We hope, that the Conference will become a traditional place to discuss special issues of Control Systems and Mathematical Modeling, Automation and using advanced knowledge in the Power Industry to solve scientific and practical production problems.

SUMMA2024 TOPICS

Scientific program includes topics of interest that consist of, but are not limited to:

I. Industrial Applied Mathematics and Modeling *Mathematical Foundations of Control Theory; Control of Organizational and Socio-Economic Systems; Machine Learning*

II. Automation *Industrial Automation and Control Theory applying to Technological Processes; Digitalization in Industrial, Economic and Social Systems; Metals and Mining Industry; Transportation Systems*

III. Industrial and Commercial Power and Power Conversion Systems *Energy Systems and Power Systems Engineering; Electric Machines and Industrial Drives; Power Electronic Devices and Components*

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Wednesday, November, 13 2024

Join Opening Ceremony (via Yandex Telemost)

10:00 – 10:30 (MSK, UTC+3)	Opening Ceremony	
	<p>Lilia ZAGEEVA, Cand.Sc., Associate Prof. <i>Russia, Lipetsk, Lipetsk State Technical University</i></p> <p>Dmitry NOVIKOV, Academician of RAS, D.Sc., Prof. <i>Russia, Moscow, V.A. Trapeznikov Institute of Control Sciences RAS</i></p> <p>Stanimir VALTCHEV, Prof. <i>Portugal, Universidade Nova de Lisboa</i></p>	
10:30 – 12:30 (MSK, UTC+3)	Plenary Session	Chair Prof. Stanimir VALTCHEV
	<p>Stanimir VALTCHEV, Prof. <i>Portugal, Universidade Nova de Lisboa</i></p> <p>Is Hydrogen Saving our Energy System, and Will it Be "Green"?</p>	
	<p>Alexander CHKHARTISHVILI, D.Sc., Prof. <i>Russia, Moscow, V.A. Trapeznikov Institute of Control Sciences RAS</i></p> <p>On Approaches to the Analysis of Scientific Activity in the Field of Control Theory</p>	
	<p>Lidija TOMIC, Dr. <i>Serbia, Belgrade, Civil Aviation Directorate of the Republic of Serbia</i></p> <p>Olja ČOKORIO, Dr., Prof. <i>Serbia, Belgrade, University of Belgrade Faculty of Transport and Traffic Engineering</i></p> <p>Shaping the Future of Aviation Industry: the Latest UAS Advancements and Implementation Strategies</p>	
	<p>Yuri GROMOV, D.Sc., Prof. <i>Russia, Tambov, Tambov State Technical University</i></p> <p>Graphodynamics, UAVs and Solved Problems</p>	
12:30 – 13:30 (MSK, UTC+3)	Dinner	
13:30–15:30 (MSK, UTC+3)	Plenary Session	Chair Prof. Pavel SARAEV
	<p>Alla KRAVETS, D.Sc., Prof. <i>Russia, Volgograd, Volgograd State Technical University</i></p> <p>GenAI: Problems and Prospects of Intelligent Systems Engineering</p>	
	<p>Svetlana MUSTAFINA, D.Sc., Prof. <i>Russia, Ufa, Ufa University of Science and Technology</i></p> <p>Application of Evolutionary Computations for Solving Optimal Control Problems with Terminal Constraints</p>	
	<p>Maria ORESHINA, Cand.Sc., Associate Prof. <i>Russia, Lipetsk, Lipetsk State Technical University</i></p> <p>Approximation to Functions of Self-adjoint Operators</p>	
	<p>Olga GORBANEVA, D.Sc., Associate Prof. <i>Russia, Rostov-on-Don, Southern Federal University</i></p> <p>Network and Non-network Dynamic SPICE-models in Organization Systems</p>	

Thursday, November, 14 2024

10:00 – 12:00 (MSK, UTC+3)	Section Sessions
12:00 – 12:30 (MSK, UTC+3)	Coffee Break
12:30 – 15:00 (MSK, UTC+3)	Section Sessions
15:00 – 15:30 (MSK, UTC+3)	Coffee Break
15:30 – 18:00 (MSK, UTC+3)	Section Sessions

13:00 (MSK, UTC+3)	SUMMA2024 LSTU Student Scientific Society Workshop Series Chair Sergey KONDRATYEV
Room 111	Nikolay KAZYURA <i>Department of Automated Electric Drive and Robotics, Lipetsk State Technical University</i> Control System Development and Programming of Educational Robotic Complex

Friday, November, 15 2024

10:00 – 13:00 (MSK, UTC+3)	Section Sessions
13:00 – 13:15 (MSK, UTC+3)	Coffee Break
13:15 – 13:30 (MSK, UTC+3)	Closing Ceremony

13:00 (MSK, UTC+3)	SUMMA2024 LSTU Student Scientific Society Workshop Series Chair Sergey KONDRATYEV
Room 111	German PROKUDIN <i>Department of Production Process Automation, Volgograd State Technical University</i> Big Data Analysis and Machine Learning Models for Solving Problems of Metallurgical Plant Automation (Sintering, Converter Processes, Rolling Production)

DETAILED PROGRAM
Thursday, November, 14 2024
(Moscow time, UTC+3)

[Join Session AM.1.1 \(via Yandex Telemost\)](#)

Session AM.1.1 Industrial Applied Mathematics and Modeling – Mathematical Foundations of Control Theory (10:00–12:00)		Chairs Prof. Anton GLUSHCHENKO	ArtID
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10:15–10:30	<i>Oleg Malafeyev, Irina Zaitseva, Mark Akbashev, Tatiana Smirnova, Sergei Miheev and Evgeny Kolpak</i> Constructing the Optimal Strategy for a Drone in an Obstacle Avoidance Problem		34
10:30–10:45	<i>Nikolay Karabutov</i> On Identifiability and Adaptive Identification of Decentralized Systems		52
10:45–11:00	<i>Aliya Kornilova, Sofya Mustafina, Dmitry Kornilov, Elvira Gizzatova, Akhat Mustafin, Rail Galiakhmetov</i> On Kinetic Modeling of the Process of Destruction of Solid Paraffin		71
11:00–11:15	<i>Leonid Yuferev and Oleg Mashev</i> Automated UAV Control For Video Monitoring At Low Altitudes		73
11:15–11:30	<i>Svetlana Mustafina</i> Algorithm for Finding Optimal Control for Problems with a Free Right Endpoint Based on Gradient Descent		76
11:30–11:45	<i>Aleksandr Krasinskiy and Anastasia Ilyina</i> Nonlinear Mathematical Model of the Systems Dynamics With Geometric Constraints and its Simplification Due to the Justified Linearization of Constraints		196
11:45–12:00	<i>Rashit Nasyrov, Ruslan Mullayanov and Alexandr Kruzhev</i> Recursive Approach to Solve Linear Optimization Problems		241

[Join Session AM.2.1 \(via Yandex Telemost\)](#)

Session AM.2.1 Industrial Applied Mathematics and Modeling – Control of Organizational and Socio-Economic Systems (10:00–11:45)		Chairs Prof. Olga GORBANEVA	ArtID
10:00–10:15	<i>Ivan Kozitsin and Vladislav Gezha</i> Macroscopic Description of Structured Heterogeneous Online Social Systems with Dynamical Opinions		3
10:15–10:30	<i>Oleg Dranko</i> Model of the Impact of Rapid Growth on Enterprise Value		4
10:30–10:45	<i>Vladimir Tsyganov</i> Training in Ranking and Controlling Corporate Production		29
10:45–11:00	<i>Oleg Malafeyev, Irina Zaitseva, Timur Nabiev, Elena Rubtsova, Irina Bogolyubova, and Dmitry Kolesov</i> Modeling Using the Leslie Matrix		69
11:00–11:15	<i>Anna Guseva and Mikhail Ermolaev</i> RPA for Business Processes: Five Dimensions of Efficiency Assessment		75

Session AM.2.1 Industrial Applied Mathematics and Modeling – Control of Organizational and Socio-Economic Systems (10:00–11:45)	Chairs Prof. Olga GORBANEVA	ArtID
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11:30–11:45	<i>Natalia Zhibanova, Elena Kuznetsova, Margarita Karlova and Tatiana Fomina</i> Application of Statistical Analysis Methods to Identify Health Problems Among the Population of Regions	243

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Session AM.3.1 Industrial Applied Mathematics and Modeling – Machine Learning (10:00–12:00)	Chairs Dr. Sergey LISTOPAD	ArtID
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[Join Session A.1.1 \(via Yandex Telemost\)](#)

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10:15-10:30	<i>Ilya Tarasov</i> Features of Architectural and Circuit Design Solutions when Designing Processors for Operation in FPGA	28
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[Join Session A.2.1 \(via Yandex Telemost\)](#)

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[Join Session A.3.1 \(via Yandex Telemost\)](#)

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10:30–10:45	<i>Pavel Bordadyn and Vladimir Korolev</i> Software Package for Assessing the Parameters of Intermittent Unbalance in a Network with Traction Load		21
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[Join Session E.3.1 \(via Yandex Telemost\)](#)

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[Join Session AM.1.2 \(via Yandex Telemost\)](#)

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[Join Session AM.2.2 \(via Yandex Telemost\)](#)

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