



19<sup>th</sup> International Conference  
named after A. F. Terpugov

# INFORMATION TECHNOLOGIES AND MATHEMATICAL MODELLING

**ITMM – 2020**

**Tomsk, Russia**  
December, 2-5, 2020



**Paulo Montezuma-Carvalho**, Universidade Nova de Lisboa, Portugal  
**Evsey Morozov**, Petrozavodsk State University, Russia  
**Valeriy Naumov**, Service Innovation Research Institute, Finland  
**Rein Nobel**, Vrije Universiteit Amsterdam, The Netherlands  
**Michele Pagano**, Pisa University, Italy  
**Tuan Phung-Duc**, University of Tsukuba, Japan  
**Thomas B. Preußer**, Technische Universität Dresden, Germany  
**Jacques Resing**, Eindhoven University of Technology, The Netherlands  
**Vladimir Rykov**, Gubkin Russian State University of Oil and Gas, Russia  
**Konstantin Samuylov**, Peoples' Friendship University of Russia, Russia  
**Sergey Suschenko**, National Research Tomsk State University, Russia  
**Daniel Stamate**, Goldsmiths College, United Kingdom  
**Janos Sztrik**, University of Debrecen, Hungary  
**Henk Tijms**, Vrije Universiteit Amsterdam, The Netherlands  
**Oleg Tikhonenko**, Cardinal Stefan Wyszyński University in Warsaw, Poland  
**Gurami Tsitsiashvili**, Institute of Applied Mathematics, Far Eastern Branch of Russian Academy of Sciences, Russia  
**Vladimir Vishnevsky**, Institute of Control Sciences, Russian Academy of Sciences, Russia  
**Anton Voitishkek**, Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia  
**Vladimir Zadorozhny**, Omsk State Technical University, Russia  
**Alexander Zamyatin**, National Research Tomsk State University, Russia  
**Andrey Zorin**, Lobachevsky State University of Nizhni Novgorod, Russia

**CONFERENCE ORGANIZING COMMITTEE**  
**ОРГАНИЗАЦИОННЫЙ КОМИТЕТ КОНФЕРЕНЦИИ**

**Svetlana Moiseeva**, National Research Tomsk State University, Russia – chair

**Svetlana Paul**, National Research Tomsk State University, Russia – co-chair

**Valentina Broner**, National Research Tomsk State University, Russia

**Elena Danilyuk**, National Research Tomsk State University, Russia

**Ekaterina Fedorova**, National Research Tomsk State University, Russia

**Anastasiya Galileiskaya**, National Research Tomsk State University, Russia

**Elena Glukhova**, Moscow Institute of Physics and Technology, Russia

**Yana Izmailova**, National Research Tomsk State University, Russia

**Irina Kochetkova**, Peoples' Friendship University of Russia, Russia

**Ivan Lapatin**, National Research Tomsk State University, Russia

**Ekaterina Lisovskaya**, Peoples' Friendship University of Russia, Russia

**Olga Lizyura**, National Research Tomsk State University, Russia

**Anna Morozova**, National Research Tomsk State University, Russia

**Svetlana Rozhkova**, National Research Tomsk Polytechnic University, Russia

**Daria Semenova**, Siberian Federal University, Russia

**Maria Shklennik**, National Research Tomsk State University, Russia

**Alexey Shkurkin**, National Research Tomsk State University, Russia

**Konstantin Voytikov**, Moscow Institute of Physics and Technology, Russia

## CONFERENCE ORGANIZERS ОРГАНИЗАТОРЫ КОНФЕРЕНЦИИ



National Research  
**Tomsk  
State  
University**

National Research Tomsk State University  
Национальный исследовательский Томский государственный университет  
International Computer Science Continues Professional Development Center  
Международный научно-методический центр по математике, информатике и цифровым технологиям



**RUDN**  
university

Peoples' Friendship University of Russia  
Российский университет дружбы народов



V.A. Trapeznikov Institute of Control Sciences of Russian Academy of Sciences  
Институт проблем управления им. В.А. Трапезникова РАН

**CONFERENCE PROGRAMM  
ПЛАН РАБОТЫ КОНФЕРЕНЦИИ**

**Venue:** National Research Tomsk State University, 634050, Lenina av. 36, Tomsk, Russian Federation

**Место проведения:** Национальный исследовательский Томский государственный университет, Томск, Россия

**Platform:** Zoom

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMMSG9QTHYxdz09>

- **Opening ceremony**
- **Plenary talks**
- **TRACK «QUEUEING THEORY AND APPLICATION»**
- **TRACK «MATHEMATICAL MODELLING OF COMMUNICATION NETWORKS»**

<https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMH03dz09>

- **TRACK «INFORMATION TECHNOLOGIES AND SOFTWARE ENGINEERING»**
- **TRACK «MATHEMATICAL AND COMPUTER MODELLING OF TECHNOLOGICAL PROCESSES»**
- **TRACK «INTELLIGENT DATA ANALYSIS AND VISUALIZATION»**

December 2, 2020 / 2 декабря 2020 г.

10.00–10.45 (Moscow)	<b>Opening ceremony of the 19<sup>th</sup> International Conference «Information Technologies and Mathematical Modelling» (ITMM – 2020) named after A.F. Terpugov.</b> <a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09</a> <b>Welcome address by:</b> <b>Artem Rykun</b> , vice-rector for International Affairs, Tomsk State University, Russia <b>Alexander Zamyatin</b> , Director of Institute of Applied Mathematics and Computer Science, Tomsk State University, Russia	<i>Working language: English</i>
14.00–14.45 (Tomsk)	<b>Konstantin Samuylov</b> , Director of Institute of Applied Mathematics & Communications Technology, Peoples' Friendship University of Russia, Russia <b>Mais Farhadov</b> , Head of Laboratory ASMON, Institute of Control Sciences, Russian Academy of Sciences, Russia <b>Alexander Dudin</b> , chair of international program committee, Belarusian State University, Belarus <b>Achyutha Krishnamoorthy</b> , prof. CMS College, India	
11.00–11.40 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09</a> <b>Plenary talk</b> “Working with a Huge Number of Antennas in 5G and Beyond: Challenges and Opportunities”	<i>Working language: English</i>
15.00–15.40 (Tomsk)	<b>Rui Dinis</b> , Universidade Nova de Lisboa, Portugal	
11.40–12.20 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09</a> <b>Plenary talk</b> “Decomposable semi-Regenerative Processes and their Applications”	<i>Working language: English</i>
15.40–16.20 (Tomsk)	<b>Vladimir Rykov</b> , Peoples' Friendship University of Russia, Russia	
13.00–14.40 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 1»</b>	<i>Working language: English</i>
17.00–18.40 (Tomsk)	<i>Chief</i> – <b>Achyutha Krishnamoorthy</b> , prof. CMS College, India <i>Moderator</i> – <b>Svetlana Paul</b> , National Research Tomsk State University, Russia	
15.00–16.40 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMsG9QThYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 2»</b>	<i>Working language: English</i>
19.00–20.40 (Tomsk)	<i>Chief</i> – <b>Alexander Dudin</b> , Belarusian State University, Belarus <i>Moderator</i> – <b>Olga Lizura</b> , National Research Tomsk State University, Russia	

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06.30–08.40 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 3»</b>	<i>Working languages: Russian, English</i>
10.30–12.40 (Tomsk)	<i>Chief – Gurami Tsitsiashvili, Institute of Applied Mathematics, Far Eastern Branch of Russian Academy of Sciences, Russia</i> <i>Moderator – Ivan Lapatin, National Research Tomsk State University, Russia</i>	
10.00–11.00 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>Plenary talk “Terahertz wireless networks: applications, challenges, and early solutions»</b>	<i>Working language: Russian</i>
14.00–15.00 (Tomsk)	<b>Dmitry Molchanov</b> , Tampere University of Technology, Finland Peoples’ Friendship University of Russia, Russia	
11.00–12.00 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>Plenary talk “Binary and multi-class classification in network anomaly detection using deep neural networks”</b>	<i>Working language: Russian</i>
15.00–16.00 (Tomsk)	<b>Michele Pagano</b> , Pisa University, Italy	
13.20–15.00 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 4»</b>	<i>Working language: English</i>
17.20–19.00 (Tomsk)	<i>Chief – Tuan Phung-Duc, University of Tsukuba, Japan</i> <i>Moderator – Olga Lizura, National Research Tomsk State University, Russia</i>	
15.00–17.00 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 5»</b>	<i>Working language: Russian</i>
19.00–21.00 (Tomsk)	<i>Chiefs – Michele Pagano, Pisa University, Italy</i> <i>Moderator – Maria Shklennik, National Research Tomsk State University, Russia</i>	
13.00–15.00 (Moscow)	<a href="https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09">https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09</a> <b>TRACK «INFORMATION TECHNOLOGIES AND SOFTWARE ENGINEERING 1»</b>	<i>Working language: Russian</i>
17.00–19.00 (Tomsk)	<i>Chiefs – Alexander Moiseev, National Research Tomsk State University, Russia</i> <b>Konstantin Voytikov</b> , Moscow Institute of Physics and Technology, Russia <i>Moderator – Alexey Shkurkin, National Research Tomsk State University, Russia</i>	



15.00–17.00 (Moscow)	<a href="https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09">https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09</a> <b>TRACK «INFORMATION TECHNOLOGIES AND SOFTWARE ENGINEERING 2»</b> <i>Chiefs – Alexander Moiseev, National Research Tomsk State University, Russia</i> <b>Konstantin Voytikov, Moscow Institute of Physics and Technology, Russia</b> <i>Moderator – Alexey Shkurkin, National Research Tomsk State University, Russia</i>	<i>Working language: Russian</i>
19.00–21.00 (Tomsk)		
<b>December 4, 2020 / 4 декабря 2020 г.</b>		
08.00–11.00 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 6»</b> <i>Chiefs – Anatoly Nazarov, National Research Tomsk State University, Russia</i> <b>Andrei Zorine, Lobachevsky State University of Nizhni Novgorod, Russia</b> <i>Moderators – Yana Izmailova, National Research Tomsk State University, Russia</i> <b>Ekaterina Pavlova, National Research Tomsk State University, Russia</b>	<i>Working language: Russian</i>
12.00–15.00 (Tomsk)		
11.30–13.50 (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09</a> <b>TRACK «MATHEMATICAL MODELLING OF COMMUNICATION NETWORKS»</b> <i>Chiefs – Janos Sztrik, University of Debrecen, Hungary</i> <b>Sergey Suschenko, National Research Tomsk State University, Russia</b> <i>Moderators – Elena Danilyuk, National Research Tomsk State University, Russia</i> <b>Ekaterina Lisovskaya, Peoples' Friendship University of Russia, Russia</b>	<i>Working languages: English, Russian</i>
15.30–17.50 (Tomsk)		
11.00–15.00 (Moscow)	<a href="https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09">https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09</a> <b>TRACK «INTELLIGENT DATA ANALYSIS AND VISUALIZATION»</b> <i>Chiefs – Mais Farhadov, Institute of Control Sciences, Russian Academy of Sciences, Russia</i> <b>Daria Semenova, Siberian Federal University, Russia</b> <i>Moderator – Svetlana Moiseeva, National Research Tomsk State University, Russia</i>	<i>Working language: Russian</i>
15.00–19.00 (Tomsk)		

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<b>08.00–14.00</b> (Moscow)	<a href="https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09">https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09</a> <b>TRACK «MATHEMATICAL AND COMPUTER MODELLING OF TECHNOLOGICAL PROCESSES»</b> <i>Chiefs – Anton Voitishkek</i> , Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia <i>Svetlana Moiseeva</i> , National Research Tomsk State University, Russia <i>Moderator – Valentina Broner</i> , National Research Tomsk State University, Russia	<i>Working languages: Russian</i>
<b>12.00–18.00</b> (Tomsk)		
<b>10.00–11.20</b> (Moscow)	<a href="https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMSG9QTHYxdz09">https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMSG9QTHYxdz09</a> <b>TRACK «QUEUEING THEORY AND APPLICATION 7»</b> <i>Chief – Svetlana Rozhkova</i> , National Research Tomsk Polytechnic University, Russia <i>Moderator – Ekaterina Lisovskaya</i> , Peoples' Friendship University of Russia, Russia	<i>Working language: Russian</i>
<b>14.00–15.20</b> (Tomsk)		

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TRACK «QUEUEING THEORY AND APPLICATION 1» / СЕКЦИЯ «Теория массового обслуживания 1»

13.00–14.40 (Moscow) / 17.00–18.40 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAaWUUVIWFzSzdzdVVMMSG90THYxdz09>

*Working language: English*

*Chief – Achyutha Krishnamoorthy, prof. CMS College, India*

*Moderator – Svetlana Paul, National Research Tomsk State University, Russia*

13.00–13.40 (Moscow)	<i>Balasubramanian Krishna Kumar, Amirthalingam Thanikachalam, Rathinam Sankar, Ramachandran Navaneetha Krishnan</i>	<i>Oscillating Service System Between Regular and Retrial Queues for Impatient Customers with Switch-off and Close-down Periods</i>
17.00–17.40 (Tomsk)		
13.40–14.00 (Moscow)	<i>Dhanya Babu, Varghese C. Joshua, Achyutha Krishnamoorthy</i>	A Queueing System with Probabilistic Joining Strategy for Priority Customers
17.40–18.00 (Tomsk)		
14.00–14.20 (Moscow)	<i>Abdul Rof V, Achyutha Krishnamoorthy</i>	A k-stage Queueing Inventory with Reduction Sale
18.00–18.20 (Tomsk)		
14.20–14.40 (Moscow)	<i>Nisha Mathew, Varghese C. Joshua, Achyutha Krishnamoorthy</i>	On a MMAP/(PH,PH)/1/( $\infty$ ,N) Queueing-Inventory System.
18.20–18.40 (Tomsk)		

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TRACK «QUEUEING THEORY AND APPLICATION 2» / СЕКЦИЯ «Теория массового обслуживания 2»

15.00–16.40 (Moscow) / 19.00–20.40 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAaWUUVIWFzSzdZdVVMMSG90THYxdz09>

*Working language: English*

*Chief – Alexander Dudin, Belarusian State University, Belarus*

*Moderator – Olga Lizura, National Research Tomsk State University, Russia*

15.00–15.20 (Moscow)	<i>Valentina Klimenok, Alexander Dudin, Ivan Vankovich</i>	Стационарные характеристики системы массового обслуживания с повторными вызовами и поиском на орбите
19.00–19.20 (Tomsk)		
15.20–15.40 (Moscow)	<i>Anatoly Nazarov, Tuan Phung-Duc, Svetlana Paul, Olga Lizyura, Ksenia Shulgina</i>	Asymptotic Analysis of Markovian Retrial Queue with Unreliable Server and Two-Way Communication under Low Rate of Retrials Condition
19.20–19.40 (Tomsk)		
15.40–16.00 (Moscow)	<i>Sandhya E, Sreenivasan C, Sajeev Nair</i>	An Explicit Solution for an Inventory Model with Positive Lead Time and Backlogs
19.40–20.00 (Tomsk)		
16.00–16.20 (Moscow)	<i>Ranjith K R, Achyutha Krishnamoorthy, Gopakumar B</i>	Analysis of a PH/PH/1 queue with interdependence
20.00–20.20 (Tomsk)		
16.20–16.40 (Moscow)	<i>Anilkumar M P, Jose K. P.</i>	An Eigen Value Approach to a Discrete-Time Queueing Model with N-Policy on Two Modes of Service
20.20–20.40 (Tomsk)		

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TRACK «QUEUEING THEORY AND APPLICATION 3» / СЕКЦИЯ «Теория массового обслуживания 3»

06.30–08.40 (Moscow) / 10.30–12.40 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlZSzdZdVVMMSG90THYxdz09>

*Working languages: Russian, English*

*Chief – Gurami Tsitsiashvili, Far Eastern Branch of Russian Academy of Sciences, Russia*

*Moderator – Ivan Lapatin, National Research Tomsk State University, Russia*

<b>06.30–07.00 (Moscow)</b>	<i>Khanik Kerobyan,</i>	Virtual waiting time in single server queueing model $M G 1$ with unreliable server and catastrophes
<b>10.30–11.00 (Tomsk)</b>	<i>Ruben Kerobyan</i>	
<b>07.00–07.30 (Moscow)</b>	<i>Anatoly Nazarov,</i>	Asymptotic-diffusion analysis of multiserver retrial queueing system with priority customers
<b>11.00–11.30 (Tomsk)</b>	<i>Tuan Phung-Duc, Yana Izmailova</i>	
<b>07.30–08.00 (Moscow)</b>	<i>Gurami Tsitsiashvili,</i>	Асимптотическая оценка интенсивности сборки пуассоновских потоков
<b>11.30–12.00 (Tomsk)</b>	<i>Anatoly Nazarov, Alexander Moiseev</i>	
<b>08.00–08.20 (Moscow)</b>	<i>Ivan Lapatin,</i>	Исследование двумерного выходящего потока марковской модели узла обработки запросов с повторными обращениями и вызываемыми заявками
<b>12.00–12.20 (Tomsk)</b>	<i>Anatoly Nazarov, Alexey Blaginin</i>	
<b>08.20–08.40 (Moscow)</b>	<i>Agassi Melikov,</i>	Analyses of feedback queue with positive server setup time and impatient calls
<b>12.20–12.40 (Tomsk)</b>	<i>Sevinj Aliyeva, Divya V</i>	

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TRACK «QUEUEING THEORY AND APPLICATION 4» / СЕКЦИЯ «Теория массового обслуживания 4»

13.20–15.00 (Moscow) / 17.20–19.00 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG90THYxdz09>

*Working language: English*

*Chief – Tuan Phung-Duc, University of Tsukuba, Japan*

*Moderator –Olga Lizura, National Research Tomsk State University, Russia*

13.20–13.40 (Moscow)	Beena P,	A MAP/PH(1), PH(2)/2 Inventory System with Production, Multiple Servers and Vacations
17.20–17.40 (Tomsk)	Jose K. P.	
13.40–14.00 (Moscow)	Khamis Abdullah Khamis AL Maqbali,	On A Single Server Queueing Inventory System With Common Life Time For Inventoried Items
17.40–18.00 (Tomsk)	Varghese C. Joshua, Achyutha Krishnamoorthy	
14.00–14.20 (Moscow)	SMIJA SKARIA,	Transient Analysis of an Inventory Model with Instantaneous Replenishment and Catastrophes
18.00–18.20 (Tomsk)	Sajeev Nair	
14.20–14.40 (Moscow)	Vadym Ponomarov	The exact formulas for state-dependent Markov retrial queues
18.20–18.40 (Tomsk)		
14.40–15.00 (Moscow)	Achyutha Krishnamoorthy,	A Reliability Problem with Interdependent Lifetimes
18.40–18.00 (Tomsk)	Varghese C. Joshua, Ambily P. Mathew	

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TRACK «QUEUEING THEORY AND APPLICATION 5» / СЕКЦИЯ «Теория массового обслуживания 5»

15.00–17.00 (Moscow) / 19.00–21.00 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG90THYxdz09>

*Working language: Russian*

*Chiefs – Michele Pagano, Pisa University, Italy*

*Moderator – Maria Shklennik, National Research Tomsk State University, Russia*

15.00–15.20 (Moscow)	Vladimir Zadorozhnyi, Michele Pagano,	Application of infinite markings methods to networks with packet switching
19.00–19.20 (Tomsk)	Tatiana Zakharenkova	
15.20–15.40 (Moscow)	Stepan Rogozin,	Stability condition of a modified Erlang loss system with different service rates
19.20–19.40 (Tomsk)	Evsey Morozov	
15.40–16.00 (Moscow)	Elmira Yu. Kalimulina	On Convergence of Queuing Network with changing structure to stationary distribution
19.40–20.00 (Tomsk)		
16.00–16.20 (Moscow)	Hanna Livinska,	Gaussian approximation and reducing of dimension for a general-type multichannel network
20.00–20.20 (Tomsk)	Eugene Lebedev	
16.20–16.40 (Moscow)	Vytovtov K.A.,	The Analytical Method For Analyzing a System, Continuous Time And Doubly Stochastic Poisson Flows
20.20–20.40 (Tomsk)	Barabanova E.A., Vishnevsky V.M.	
16.40–17.00 (Moscow)	Vladimir Zadorozhnyi,	Infinite markings method in queueing systems with unknown service time for arriving requests
20.40–21.00 (Tomsk)	Tatiana Zakharenkova	

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TRACK «INFORMATION TECHNOLOGIES AND SOFTWARE ENGINEERING 1» / СЕКЦИЯ «Информационные технологии и программная инженерия 1»

13.00–15.00 (Moscow) / 17.00–19.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09>

*Working language: Russian*

*Chiefs – Alexander Moiseev, National Research Tomsk State University, Russia*

*Konstantin Voytikov, Moscow Institute of Physics and Technology, Russia*

*Moderator – Alexey Shkurkin, National Research Tomsk State University, Russia*

13.00–13.20 (Moscow)	<i>Marat Gainutdinov</i>	Development of back-end of the service for internationalization of web applications
17.00–17.20 (Tomsk)		
13.20–13.40 (Moscow)	<i>Yana Lebedeva,</i>	Разработка системы управления специальным банковским оборудованием
17.20–17.40 (Tomsk)	<i>Viacheslav Vavilov</i>	
13.40–14.00 (Moscow)	<i>Igor Zhukov,</i>	Программная реализация заданий по программированию с многовариантными решениями
17.40–18.00 (Tomsk)	<i>Kostyuk Yury</i>	
14.00–14.20 (Moscow)	<i>Yuliya Protasevich</i>	Поддержка настраиваемых типов проектов в системе автоматизации управления Git-репозиториями для использования в процессе обучения
18.00–18.20 (Tomsk)		
14.20–14.40 (Moscow)	<i>Ruslan Ishtuganov</i>	Распределенные параллельные вычисления в python
18.20–18.40 (Tomsk)		
14.40–15.00 (Moscow)	<i>Ludmila Demidenko</i>	Проектирование базовой архитектуры модуля «Расписание» системы Alterum Med
18.40–19.00 (Tomsk)		



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TRACK «INFORMATION TECHNOLOGIES AND SOFTWARE ENGINEERING 2» / СЕКЦИЯ «Информационные технологии и программная инженерия 2»

15.00–17.00 (Moscow) / 19.00–21.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVaNStUzZmFNUWVwSEZlRnBiMHh03dz09>

*Working language: Russian*

*Chiefs – Alexander Moiseev, National Research Tomsk State University, Russia*

*Konstantin Voytikov, Moscow Institute of Physics and Technology, Russia*

*Moderator – Alexey Shkurkin, National Research Tomsk State University, Russia*

15.00–15.20 (Moscow)	<i>Елена Квач,</i>	«IS-A»-отношение, как способ представления взаимосвязи обобщенных и специализированных понятий
19.00–19.20 (Tomsk)	<i>Aleksey Babanov</i>	
15.20–15.40 (Moscow)	<i>Jana Kulikova,</i>	Сценарии управления беспилотными транспортными средствами в среде «Умного города»
19.20–19.40 (Tomsk)	<i>Kachalov Dmitry</i>	
15.40–16.00 (Moscow)	<i>Denis Zmeev</i>	О представлении прогресса проекта по разработке программного обеспечения в форме динамической байесовской сети
19.40–20.00 (Tomsk)		
16.00–16.20 (Moscow)	<i>Евгения Соколова,</i>	Формальная модель образовательной программы в области компьютерных наук с точки зрения международного стандарта ACM и IEEE
20.00–20.20 (Tomsk)	<i>Tatyana Ketova</i>	
16.20–16.40 (Moscow)	<i>Vadim Trenkaev</i>	Обзор исследований по проблеме достижения высокой производительности протокола OPC UA
20.20–20.40 (Tomsk)		
16.40–17.00 (Moscow)	<i>Evgeny Polin,</i>	Имитационное моделирование СМО с входящими потоками, параметры которых зависят от состояния системы
20.40–21.00 (Tomsk)	<i>Alexander Moiseev, Konstantin Voytikov</i>	

December 4, 2020 / 4 декабря 2020 г.

TRACK «QUEUEING THEORY AND APPLICATION 6» / СЕКЦИЯ «Теория массового обслуживания 6»

08.00–11.00 (Moscow) / 12.00–15.00 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG90THYxdz09>

*Working language: Russian*

*Chiefs – Anatoly Nazarov, National Research Tomsk State University, Russia*

*Andrei Zorine, Lobachevsky State University of Nizhni Novgorod, Russia*

*Moderators – Yana Izmailova, Ekaterina Pavlova, National Research Tomsk State University, Russia*

08.00–08.20 (Moscow)	Anatoly Nazarov,	Asymptotic waiting time analysis of a M/M/1 retrial queueing system
12.00–12.20 (Tomsk)	Maria Samorodova	
08.20–08.40 (Moscow)	Anatoly Nazarov,	Исследование СМО вида ММРР M N с обратной связью методом асимптотически диффузионного анализа
12.20–12.40 (Tomsk)	Ekaterina Pavlova	
08.40–09.00 (Moscow)	Сущенко С.П.,	Прямая коррекция ошибок на внутрисегментном уровне транспортного протокола
12.40–13.00 (Tomsk)	Мухеев П.А., Pavel Pristupa	
09.00–09.20 (Moscow)	Елена Станкевич,	Приближенный метод анализа замкнутых сетей массового обслуживания с ненадежными системами и групповым обслуживанием
13.00–13.20 (Tomsk)	Igor Tananko	
09.20–09.40 (Moscow)	Елена Станкевич,	Метод анализа замкнутых сетей массового обслуживания с системами типа $M_a / M[x,y] / 1$
13.20–13.40 (Tomsk)	Igor Tananko	

December 4, 2020 / 4 декабря 2020 г.

TRACK «QUEUEING THEORY AND APPLICATION 6» / СЕКЦИЯ «Теория массового обслуживания 6»

08.00–11.00 (Moscow) / 12.00–15.00 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAaWUvIWFlzSzdzdVVMMSG90THYxdz09>

*Working language: Russian*

*Chiefs – Andrei Zorine, Lobachevsky State University of Nizhni Novgorod, Russia*

*Anatoly Nazarov, National Research Tomsk State University, Russia*

*Moderators – Yana Izmailova, Ekaterina Pavlova, National Research Tomsk State University, Russia*

09.40–10.00 (Moscow)	<i>Andrei Zorine, Kseniya Sizova</i>	Метод решения стационарных уравнений для процесса приоритетного обслуживания с разделением времени в случайной среде
13.40–14.00 (Tomsk)		
10.00–10.20 (Moscow)	<i>Victoria Sannikova, Ekaterina Proydakova</i>	Математическое моделирование и исследование приоритетной управляющей системы с непостоянной интенсивностью обслуживания требований
14.00–14.20 (Tomsk)		
10.20–10.40 (Moscow)	<i>Maksim Zharkov, Michael Pavidis</i>	Об использовании четырехфазных систем массового обслуживания для описания работы грузовых и сортировочных железнодорожных станций
14.20–14.40 (Tomsk)		
10.40–11.00 (Moscow)	<i>Dzmitry Kopats</i>	Анализ ожидаемого дохода в открытой сети с ограниченным числом заявок и обходами ими систем обслуживания
14.40–15.00 (Tomsk)		

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TRACK «MATHEMATICAL MODELLING OF COMMUNICATION NETWORKS» / СЕКЦИЯ «Математическое моделирование телекоммуникационных сетей»

11.30–13.50 (Moscow) / 15.30–17.50 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAwWUVlWFlzSzdzdVVMMSG9QTHYxdz09>

*Working languages: English, Russian*

*Chiefs – Janos Sztrik, University of Debrecen, Hungary*

*Sergey Suschenko, National Research Tomsk State University, Russia*

*Moderators – Elena Danilyuk, National Research Tomsk State University, Russia*

*Ekaterina Lisovskaya, Peoples' Friendship University of Russia, Russia*

11.30–11.50 (Moscow)	<i>János Sztrik,</i>	Some special features of finite-source retrial queues with collisions, an unreliable server and impatient customers in the orbit
15.30–15.50 (Tomsk)	<i>Tóth Ádám</i>	
11.50–12.10 (Moscow)	<i>Tóth Ádám,</i> <i>János Sztrik,</i>	Simulation of retrial queueing system M/G/1 with impatient customers, collisions and unreliable server
15.50–16.10 (Tomsk)	<i>Elena Danilyuk,</i> <i>Svetlana Moiseeva</i>	
12.10–12.30 (Moscow)	<i>Anastasia Daraseliya,</i>	Optimization of task offloading thresholds in the fog computing system
16.10–16.30 (Tomsk)	<i>Eduard Sopin</i>	
12.30–12.50 (Moscow)	<i>Eduard Sopin,</i>	Analysis of the processor sharing systems with random serving rate coefficients
16.30–16.50 (Tomsk)	<i>Maxim Korshikov</i>	
12.50–13.10 (Moscow)	<i>Mohamed Hedi Zaghouani,</i>	Simulation analysis in cognitive radio networks with unreliability and abandonment
16.50–17.10 (Tomsk)	<i>Hamza Nemouchi,</i> <i>János Sztrik</i>	
13.10–13.30 (Moscow)	<i>Kirill Ageev,</i>	Analysis of the Simplified Network Slicing Model
17.10–17.30 (Tomsk)	<i>Eduard Sopin</i>	
13.30–13.50 (Moscow)	<i>Yves Adou,</i>	To queueing system model performance measures analysis under network slicing
17.30–17.50 (Tomsk)	<i>Ekaterina Markova</i>	

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TRACK «INTELLIGENT DATA ANALYSIS AND VISUALIZATION» / СЕКЦИЯ «Интеллектуальный анализ данных и визуализация»

11.00–15.00 (Moscow) / 15.00–19.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVaNStUzZmFNUWVwSEZlRnBiMHh03dz09>

*Working language: Russian*

*Chiefs – Mais Farhadov, Institute of Control Sciences, Russian Academy of Sciences, Russia*

*Daria Semenova, Siberian Federal University, Russia*

*Moderator – Svetlana Moiseeva, National Research Tomsk State University, Russia*

11.00–11.20 (Moscow)	<i>Aleksandr Soldatenko,</i>	Алгоритм HGFC нахождения формальных понятий
15.00–15.20 (Tomsk)	<i>Daria Semenova</i>	
11.20–11.40 (Moscow)	<i>Irina Baranova</i>	Применение метода двудольных множеств событий в задачах регрессионного анализа многомерных разнотипных данных
15.20–15.40 (Tomsk)		
11.40–12.00 (Moscow)	<i>Yuri Gagarin,</i>	Прогнозирование частных показателей индекса активного долголетия
15.40–16.00 (Tomsk)	<i>Gagarina Svetlana</i>	
12.00–12.20 (Moscow)	<i>Inna Batraeva,</i>	Алгоритм репрезентации кастомизированных диалектологических корпусов для Саратовского диалектологического корпуса русского языка
16.00–16.20 (Tomsk)	<i>Aleksandra Kriuchkova</i>	
12.20–12.40 (Moscow)	<i>Alyona Borisovskaya</i>	Methods of spelling correction in information retrieval systems
16.20–16.40 (Tomsk)		
12.40–13.00 (Moscow)	<i>Сергей Смирнов,</i>	Первичный концептуальный анализ сестринского дела для экспертной советующей системы
16.40–17.00 (Tomsk)	<i>Анна Ивлева</i>	

December 4, 2020 / 4 декабря 2020 г.

TRACK «INTELLIGENT DATA ANALYSIS AND VISUALIZATION» / СЕКЦИЯ «Интеллектуальный анализ данных и визуализация»

11.00–15.00 (Moscow) / 15.00–19.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVSTUzMmFNUWVwSEZIRnBiMHo3dz09>

*Working language: Russian*

*Chiefs – Mais Farhadov, Institute of Control Sciences, Russian Academy of Sciences, Russia*

*Daria Semenova, Siberian Federal University, Russia*

*Moderator – Svetlana Moiseeva, National Research Tomsk State University, Russia*

13.00–13.20 (Moscow)	<i>Ivan Brokarev,</i>	Recurrent neural networks to analyze the quality of natural gas
17.00–17.20 (Tomsk)	<i>Mais Farkhadov, Sergey Vaskovskii</i>	
13.20–13.40 (Moscow)	<i>Ivan Brokarev,</i>	Analysis of reliability of gas analysis system based on vector Wiener process
17.20–17.40 (Tomsk)	<i>Sergey Vaskovskii</i>	
13.40–14.00 (Moscow)	<i>Victoria Shamraeva</i>	BIM modeling of transport infrastructure objects
17.40–18.00 (Tomsk)		
14.00–14.20 (Moscow)	<i>Ellada Ibragimova,</i>	Recognition of k-clusterability of signed graphs
18.00–18.20 (Tomsk)	<i>Daria Semenova</i>	
14.20–14.40 (Moscow)	<i>Valeriy Golyshev,</i>	Fuzzy formal concept analysis: $\alpha$ -cut method
18.20–18.40 (Tomsk)	<i>Daria Semenova</i>	
14.40–15.00 (Moscow)	<i>Stepan Gilin</i>	Решение задачи распознавания образов при помощи алгоритма гибридной СММ-нейросети
18.40–19.00 (Tomsk)		

December 5, 2020 / 5 декабря 2020 г.

TRACK «MATHEMATICAL AND COMPUTER MODELLING OF TECHNOLOGICAL PROCESSES» / СЕКЦИЯ

«Математическое и компьютерное моделирование технологических процессов»

08.00–14.00 (Moscow) / 12.00–18.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVSTUzMmFNUWVwSEZIRnBiMHh03dz09>

*Working language: Russian*

*Chiefs – Anton Voitishkek, Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia*

*Svetlana Moiseeva, National Research Tomsk State University, Russia*

*Moderator – Valentina Broner, National Research Tomsk State University, Russia*

08.00–08.20 (Moscow)	<i>Anton Voytishek</i>	Об особенностях выбора аппроксимационных ортонормированных базисов в рандомизированных численных проекционных функциональных алгоритмах
12.00–12.20 (Tomsk)		
08.20–08.40 (Moscow)	<i>Anton Voytishek</i>	Система численного моделирования одномерных случайных величин NMPUD: формирование банка плотностей, автоматизация математических выкладок и приложения
12.20–12.40 (Tomsk)		
08.40–09.00 (Moscow)	<i>Nikita Belyakov, Dmitry Fedchenko, Rustam Bikmurzin</i>	Automata, graphs, quasigroups
12.40–13.00 (Tomsk)		
09.00–09.20 (Moscow)	<i>Serguei Pitchouguine</i>	Problem Definition for LEO System Switching Technique Development
13.00–13.20 (Tomsk)		
09.20–09.40 (Moscow)	<i>Irina Gendrina</i>	Использование метода фиктивных переменных для исследования пространственной характеристики систем видения через атмосферу
13.20–13.40 (Tomsk)		
09.40–10.00 (Moscow)	<i>Shakhmurad Kanzitdinov, Sergey Vasilyev, Kassy Dougg Feussy Warren, Michelle Beugre</i>	Stability analysis and motion of the Kapitza pendulum
13.40–14.00 (Tomsk)		

December 5, 2020 / 5 декабря 2020 г.

TRACK «MATHEMATICAL AND COMPUTER MODELLING OF TECHNOLOGICAL PROCESSES» / СЕКЦИЯ

«Математическое и компьютерное моделирование технологических процессов»

08.00–14.00 (Moscow) / 12.00–18.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVSTUzMmFNUWVwSEZlRnBiMHh03dz09>

*Working language: Russian*

*Chiefs – Anton Voitishek, Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia*

*Svetlana Moiseeva, National Research Tomsk State University, Russia*

*Moderator – Valentina Broner, National Research Tomsk State University, Russia*

10.00–10.20 (Moscow)	<i>Mohamed Adel Bouatta, Vyacheclav Fedorchenko, Sergey Vasilyev</i>	Численный анализ на адаптивных сетках многомерного уравнения Фоккера-Планка с малым параметром
14.00–14.20 (Tomsk)		
10.20–10.40 (Moscow)	<i>Sergey Vasilyev, Daniel Peres Acosta, Shakhmurad Kanzitdinov, Igor Levichev</i>	Построение решений задач оптимального управления динамическими системами в бесконечномерных пространствах с малым параметром
14.20–14.40 (Tomsk)		
10.40–11.00 (Moscow)	<i>Mohamed Adel Bouatta, Darya Vasilyeva, Irina Kolosova, Evgeniya Korshok</i>	Kadyshevsky equation numerical analysis with periodic boundary conditions on adaptive grids
14.40–15.00 (Tomsk)		
11.20–11.40 (Moscow)	<i>Maria Shklennik, Alexander Moiseev</i>	Реализация механизма сбора и обработки статистических данных потоков заявок в системе имитационного моделирования ODIS
15.20–15.40 (Tomsk)		
11.40–12.00 (Moscow)	<i>Jozil Takhirov</i>	A reaction-diffusion-advection competition model with a free boundary
15.40–16.00 (Tomsk)		
12.00–12.20 (Moscow)	<i>Владислав Литвинов</i>	Research of transverse rope oscillations moving in the longitudinal direction
16.00–16.20 (Tomsk)		



December 5, 2020 / 5 декабря 2020 г.

TRACK «MATHEMATICAL AND COMPUTER MODELLING OF TECHNOLOGICAL PROCESSES» / СЕКЦИЯ

«Математическое и компьютерное моделирование технологических процессов»

08.00–14.00 (Moscow) / 12.00–18.00 (Tomsk)

<https://us02web.zoom.us/j/74886816199?pwd=VElVaStUZmFNUWVwSEZlRnBiMHo3dz09>

*Working language: Russian*

*Chiefs – Anton Voitshkek, Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Russia*

*Svetlana Moiseeva, National Research Tomsk State University, Russia*

*Moderator – Valentina Broner, National Research Tomsk State University, Russia*

12.20–12.40 (Moscow)	Olga Kuzovatova	Компьютерное моделирование локализации деформации сыпучей среды в сходящемся канале
16.20–16.40 (Tomsk)		
12.40–13.00 (Moscow)	Viacheslav Kuvykin, Maksim Bryukhanov	Математическое и компьютерное моделирование системы согласования материального баланса в нефтепереработке и нефтехимии
16.40–17.00 (Tomsk)		
13.00–13.20 (Moscow)	Viacheslav Kuvykin, Elena Kolpakova, Artem Kolpakov	Параметрический анализ математических моделей оптимального планирования нефтепереработки и компьютерное моделирование
17.00–17.20 (Tomsk)		
13.20–13.40 (Moscow)	Anton Esin	Теоретические аспекты построения современных систем управления на базе многозначной логики
17.20–17.40 (Tomsk)		
13.40–14.00 (Moscow)	Anton Esin	Исследование принципов применения моделей многозначной логики в современных приложениях
17.40–18.00 (Tomsk)		

December 5, 2020 / 5 декабря 2020 г.

TRACK «QUEUEING THEORY AND APPLICATION 7» / СЕКЦИЯ «Теория массового обслуживания 7»

10.00–11.40 (Moscow) / 14.00–15.40 (Tomsk)

<https://us04web.zoom.us/j/8967702999?pwd=bXAaWUwVlZSzdZdVVMMSG90THYxdz09>

*Working language: Russian*

*Chief – Svetlana Rozhkova, National Research Tomsk Polytechnic University, Russia*

*Moderator – Ekaterina Lisovskaya, Peoples' Friendship University of Russia, Russia*

10.00–10.20 (Moscow)	Anna Boyarkina, Svetlana Moiseeva,	СМО вида GI(K)/GI/∞ с групповым обслуживанием
14.00–14.20 (Tomsk)	Irina Turenova, Alexey Shkurkin	
10.20–10.40 (Moscow)	Faina Moskaleva, Ekaterina Lisovskaya,	A Two-Class Service System for Performance Analysis of Network Slicing with QoS Isolation
14.20–14.40 (Tomsk)	Yuliya Gaidamaka	
10.40–11.00 (Moscow)	Svetlana Rozhkova, Nataliya Voronina,	Асимптотический анализ гq-системы м/м/1 с ненадежным прибором мегаматричным методом
14.40–15.00 (Tomsk)	Alexandra Semashko	
11.00–11.20 (Moscow)	Anatoly Nazarov, Svetlana Rozhkova,	Исследование системы с обратной связью, рекуррентным обслуживанием и неординарным пуассоновским входящим потоком
15.00–15.20 (Tomsk)	Ekaterina Titarenko	
11.20–11.40 (Moscow)	Татьяна Бушкова, Svetlana Moiseeva,	Асимптотический анализ ресурсной гетерогенной СМО (MMPP+2M)(v)/M/∞
15.20–15.40 (Tomsk)	Ekaterina Lisovskaya, Anastasia Galileyskaya	