

# **2019 15th International Asian School-Seminar Optimization Problems of Complex Systems (OPCS 2019)**

**Novosibirsk, Russia  
26 – 30 August 2019**



IEEE Catalog Number: CFP19U46-POD  
ISBN: 978-1-7281-2987-7

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP19U46-POD
ISBN (Print-On-Demand):	978-1-7281-2987-7
ISBN (Online):	978-1-7281-2986-0

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# Table of Contents

On Models of Economic Development, Taking Into Account Lending <i>Sergey M. Antsyz</i> .....	4
Maximum Cross Section Method in Optimal Filtering of Jump-Diffusion Random Processes <i>Tatyana Averina, Konstantin Rybakov</i> .....	8
International Trade Models in Monopolistic Competition: the Case of Non-linear Costs <i>Ivan Belyaev, Igor Bykadorov</i> .....	12
Normalized Spectral Clustering of the Journal Citation Network <i>Sergey Bredikhin, Natalya Scherbakova</i> .....	17
Combinatorial Structure Of Optimal Solutions To The Problem Of A Single Machine With Preemption <i>Kseniya A. Chernykh, Vladimir V. Servakh</i> .....	21
Mathematical Model of Optimal Management of Staff Development in the Communications Industry <i>Lubov Danilova, Nikita Zakharov, Maria Oblaukhova</i> .....	27
Genetic Based Approach For Novosibirsk Traffic Light Scheduling <i>Ivan Daydov, Daniil Tolstykh, Polina Kononova, Irina Legikh</i> .....	31
Analysis and Optimization of PBS/TORQUE Fault Tolerance Tools <i>Alexandr V. Efimov, Kirill V. Pavsky</i> .....	37
One Class Of Clusterization Problems In Network Models <i>Edward Gimadi, Danila Chesnokov, Ekaterina Shin</i> .....	42
Asymptotically Optimal Approach to a Given Diameter Undirected Mst Problem on Random Instances <i>Edward Gimadi, Alexandr Shevyakov, Ekaterina Shin</i> .....	48
Improved Exact Algorithm for the Capacitated Facility Location Problem on a Line Graph <i>Edward Gimadi, Alexandr Shtepa, Oxana Tsidulko</i> .....	53
Catalytic Reforming Reactor Section Optimization Based On A Mathematical Model Accounting The Reaction Volume Changes <i>Irek Gubaydullin, Kamila Koledina, Sergey Koledin, Ravil Zaynaullin</i> .....	58
The Integrated Computational Environment For Optimization Of Complex Systems <i>Valery P. Ilin</i> .....	63
Optimizing Risk-Free Model of Development of Educational Organization Based on Modified Risk Thermometer <i>Yuliya Shevtsova, Valery Kanev, Aleksei Poletaikin, Nataliya Kuleshova</i> .....	68
Academician Andrei Ershov and Graphs in Programming <i>Victor Kasyanov</i> .....	73
Approaches to Recognize Cavity Inclusions in Elastic Media in Problem of Monitoring Test Sites <i>Marat Khairetdinov, Dmitry Karavaev, Alexander Yakimenko, Anton Morozov</i> .....	78
A Greedy Algorithm for Jobs Allocation in a Multiprocessor System <i>Alexandre Khutoretskii, Sergei Bredikhin</i> .....	82

Analysis and Optimization of Pipelined Broadcast Algorithms on Gigabit Ethernet and InfiniBand Networks	
<i>Mikhail Kurnosov, Daniil Berlizov, Tatiana Tkacheva, Elizaveta Tokmasheva</i>	86
The Repair Works Planning Problems in the Utility Networks Nodes	
<i>Oleg Lyakhov, Gulzhigit Toktoshov</i>	92
Discrete Optimization of Linear Fractional Functionals	
<i>Narzillo Mamatov, Abdurashid Samjonov, Zafar Yuldashev, Nilufar Niyozmatova</i>	96
A Comparative Analysis of Bioinspired Algorithms for Solving the Problem of Optimization of Circulant and Hypercirculant Networks.	
<i>Oleg Monakhov, Emilia Monakhova</i>	100
Creation of Necessary Technical And Expert-Analytical Conditions for Development of The Information System of Evaluating Open Text Information Sources' Influence on Society	
<i>Rustam Mussabayev, Bek Kassymzhanov, Aidos Mukashev, Viktoriya Ibrayeva, Azat Merkebayev</i>	104
Formation of Optimal Communication Service Portfolio for Corporate Clients	
<i>Angela Zakharova, Aleksei Poletaikin, Vadim Podkolzin, Lubov Danilova, Anna Marenkova</i>	110
About One Approach to the Planning in Retail with the Stochastic Parameters	
<i>Novikov Artem</i>	115
(m, k)-Methods for Control Theory Problems	
<i>Anton Novikov, Alexandr Levykin, Eugeny Novikov</i>	120
Self-similarity and Long Range Dependence in teletraffic	
<i>Michele Pagano</i>	125
Scenario Approach for the Optimization of Regularization Parameters in the Direct Variational Data Assimilation Algorithm	
<i>Alexey Penenko, Zhadyra Mukatova, Victoria Konopleva</i>	131
Numerical Solution of the Coefficient Inverse Problem for a Production-Destruction Model with Various Adjoint Ensemble Designs	
<i>Alexey Penenko, Zhadyra Mukatova, Akzhan Salimova</i>	135
Optimization Algorithm for Seismic Location of Underground Objects	
<i>Daria Pinigina, Alexander Yakimenko</i>	140
Distribution of Investment Resources among the Agents of a Megaproject based on the Network Model	
<i>Nina Plyaskina</i>	143
Fast Rough Bounds for the Coefficients of the Network Reliability Polynomial	
<i>Alexey Rodionov</i>	147
Finding Optimal Solutions on Models of Living Systems	
<i>Yury V. Shornikov, Evgeny A. Popov</i>	152
Retailing Under Monopolistic Competition: a Comparative Analysis	
<i>Olga Tilzo, Igor Bykadorov</i>	156
The Application of the k-shortest Paths Method for Constructing an Optimal Hypernet	
<i>Gulzhigit Toktoshov, Denis Migov</i>	162
On Edgeworth Equilibrium for a Multiregional Economic System	
<i>Valery A. Vasilev</i>	167
Approximate Solving of an Inverse Problem for a Parabolic Equation with Nonlocal Data	
<i>Elena Tabarintseva</i>	173

Simulation of Spatio-Temporal Data Streams from Geosensors Located Onmobile Objects <i>Andrey V. Materukhin, Andrey A. Maiorov, Oleg G. Gvozdev, Olga D. Sokolova</i> .....	179
Towards Air Pollution Detection with Internet of Vehicles <i>Vladimir V. Shakhov, Olga D. Sokolova</i> .....	183
Designing of Optimal Power Supply Networks for Theequipment of Multifunctional Safety Systems <i>Artem Kalney, Denis Migov, Alexey Rodionov, Kirill Tkachev, Gulzhigit Toktoshov, Tatyana Nasibullina</i> .....	187
Comparison of Various Approaches for Dependency Parsing <i>Alymzhan Toleu, Gulmira Tolegen, Rustam Mussabayev</i> .....	192
The Results of Computer Simulation of Data Acquisition Systems Based on Distributed Smart Geosensor Networks <i>Andrei V. Materukhin, Andrey A. Maiorov, Oleg G. Gvozdev</i> .....	196
Comparison Of The Work Of Algorithms For Arranging Message Distribution Devices In Transport Networks <i>Kirill V. Tkachev, Kseniya A. Volzhankina, Denis A. Migov</i> .....	200
The Interaction Interface Between the Model and the Observer Agent in the Simulation System <i>Kirill Tkachev</i> .....	204
Author Index .....	207