

2023 Dynamics of Systems, Mechanisms and Machines (Dynamics 2023)

**Omsk, Russia
14-15 November 2023**



**IEEE Catalog Number: CFP23RAB-POD
ISBN: 979-8-3503-5832-2**

**Copyright © 2023 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:	CFP23RAB-POD
ISBN (Print-On-Demand):	979-8-3503-5832-2
ISBN (Online):	979-8-3503-5831-5
ISSN:	2381-7593

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Comparing Incremental Learning Methods for Human Activity Recognition	1
<i>Elena Sergeevna Abramova, Alexey Alexandrovich Orlov, Oleg Aleksandrovich Abramov</i>	
Using System Analysis to Optimize Big Data Processing	6
<i>A. P. Afanasev, S. S. Kolmogorova</i>	
Bot Detection Using Mouse Movements	9
<i>N. S. Afanaseva, P. S. Lozhnikov</i>	
Determining the Protective Distance and Probabilities of Noise in SRD with FHSS	13
<i>V. M. Artyushenko, V. I. Volovach</i>	
Estimating the Effect of Gaussian Noise on Short-Range Wireless Devices	18
<i>V. M. Artyushenko, V. I. Volovach</i>	
Contribution of Thermal Emission to the Concentration of Charges in the Laser Beam Propagating Through the Aerosol	22
<i>S. F. Balandin, V. A. Khan, V. A. Donchenko, V. F. Myshkin, V. A. Khan, I. I. Pavlov, V. L. Khazan</i>	
Network Steganography Based on Error Correction Code	27
<i>S. V. Belim, S. A. Gorshkov, S. Yu. Belim</i>	
Construction of the Multichannel Energy Distribution System to Minimize the Reflectivity at the Generator Output	31
<i>I. V. Bogachkov</i>	
Determination of Optical Fiber Varieties and Early Diagnosis of Their Physical Condition Based on the Analysis of Mandelstam – Brillouin Scatter Parameters	36
<i>I. V. Bogachkov, N. I. Gorlov</i>	
Simulation of Induction Motor with Defect in the Rotor Winding Circuit	42
<i>A. Cherkashin, O. Lysenko</i>	
New Inductance Calculating Formulas of Planar Symmetrical Square Inductors	47
<i>V. V. Erokhin, S. A. Zavyalov</i>	
Features of Digital Filters in Raman DTS	51
<i>Ivan A. Ershov, Oleg V. Stukach, Igor V. Trubin, Sergey A. Gladyshev</i>	
Distributed Sensing of Fiber-Optic Communication Lines Using Brillouin Scattering	55
<i>N. I. Gorlov, I. V. Bogachkov</i>	
Preliminary Analysis of Machine Learning Model Input Data for Short-Term Electricity Consumption Forecasting	60
<i>A. Gorshenin, L. Denisova</i>	
The Study of an Impact of Alcohol Intoxication on Voice Parameters in Biometric Authentication Systems	65
<i>D. P. Inivatov, A. E. Sulavko, A. E. Samotuga</i>	
Trust Architecture in Apparel Supply Chains Migrating to WEB3 Protocols	71
<i>Dmitry Ivanov, Petr Pashkov</i>	

Computer Modeling of the Electric Vehicle Traction System Based on a Boost DC/DC-Converter	75
<i>Maksim Ivanov, Regina Khazieva</i>	
Features of the Study of Detection and Measurement of Side Electromagnetic Radiation of Broadband Signals on the Example of DisplayPort Interface	82
<i>A. V. Ivanov, S. R. Kopylova</i>	
Research on Highly Efficient Electric Motors with Increased Power Factor	86
<i>I'Giza Kaekbirdina, Regina Khazieva</i>	
Research and Optimization of Fuzzy Process Control System.....	92
<i>R. Karabtsov, L. Denisova</i>	
High Performance Modem for Underwater Communication Systems	95
<i>V. L. Khazan, I. I. Pavlov, V. F. Myshkin, V. A. Khan, M. S. Zavyalov</i>	
Broadband Power Divider Design with Unequal Division and Small Size.....	100
<i>A. H. Khudoyarova, D. C. Ravshanov, J. B. Kamolidinov, Kh. K. Begimov, B. S. Safarov, F. I. Isatullozoda</i>	
Design of a Planar Directional Coupler Implemented on U-Circuits	104
<i>A. H. Khudoyarova, R. S. Umaralizoda, R. Z. Mahmaddulloev, A. S. Rajabova, D. C. Ravshanov, Ch. B. Ravshanov</i>	
Application of Fuzzy Logic Algorithms in Beamformers of Antenna Complexes	108
<i>M Kiryupin, O Belousov, A Trishakov, M Belyaev, Evgeny Trapeznikov, Olga Trapeznikova, Larisa Varepo</i>	
Applications of Control Theory Approaches to Assessing the Dynamical Interactions of Elements of Technical Objects	115
<i>S. V. Korneev, R. S. Bolshakov</i>	
Modeling of Smoothing the Load Profile of a Communications Enterprise Using Distributed Energy Resources	119
<i>B. A. Kosarev</i>	
Electrical System of an Enterprise with a Wind Generator, Energy Storage System, Gas Generator and Variable Load.....	123
<i>B. A. Kosarev, D. V. Lazarev, A. V. Bubnov</i>	
Influence of Parasitic Couplings on Characteristics of a Filter Based on Solidly Mounted Resonators	126
<i>A. G. Kozlov, N. M. Zhilin</i>	
Modeling the Angular Motion of Variable Structure Spacecraft Account to the Destabilizing Properties of the Jetstream.....	132
<i>Mikhail Krikunov</i>	
Features of Acousto-Optical Laser Displacement Interferometers with Subpicometric Resolution by Double Heterodyning of Optical Signals and Auto-Tuning of the Second Heterodyne Frequency.....	137
<i>E. V. Leun</i>	
High Gain Broadband Integrated Amplifier for Instantaneous Frequency Measurement IC.....	142
<i>A. N. Lyashuk, S. A. Zavyalov, P. I. Puzyrev, Zh. B. Sadykov</i>	
Neural Network NARX Flow Identifier for a Pumping Unit with an Induction Motor	146
<i>O. A. Lysenko</i>	

Algorithm for Verifying the Authenticity of Actuators in Automated Process Control Systems	151
<i>D. N. Lyubushkina, A. A. Olennikov, A. A. Zakharov</i>	
On the Applicability of a Markov Virus Spread Model to E-Mail Graphs	155
<i>A. A. Magazev, A. Yu. Nikiforova</i>	
Application of an Incremental Method of Neural Network Training for Recognition of Symbols on Railway Wheels.....	159
<i>Andrey Mareev, Alexey Orlov, Arkady Zhiznyakov</i>	
Neural Network Model of Decision Making in a Control System Based on Lidar Data.....	163
<i>V. A. Meshcheryakov, A. B. Letopolsky, D. I. Nikolaev, I. A. Teterina</i>	
Low-Speed Speech Compression Systems	168
<i>M. I. Mineeva, D. A. Korneev</i>	
Improvement of the Method for Calculating Reserves of a Spare Parts, Tools and Accessories System	172
<i>Aleksei Motovilov</i>	
Distance Measurement Using Active-Pulse Television Measuring Systems with Automatic Scanning of Space by Depth.....	175
<i>A. K. Movchan, V. V. Kapustin, M. I. Kuryachiy, E. S. Movchan</i>	
Research of Capacitive Strip Partial Discharge Sensor for 10 kV XLPE-Insulated Cables	182
<i>D. A. Polyakov</i>	
Research of Magnetic Field Effect on Partial Discharge Characteristics	187
<i>D. A. Polyakov, M. A. Kholmov, K. I. Nikitin Omsk</i>	
Multispectral Sensor Application Possibility Research for Temperature Control in the Carbon Black Production	192
<i>D. B. Ponomarev, A. A. Valke, D. G. Lobov, A. G. Shkaev</i>	
Modeling of the Stress State During Sclerometry of Zirconium Magnetron Coatings.....	197
<i>D. V. Postnikov, E. A. Tkachenko, A. A. Teploukhov</i>	
Method for Validating the Mathematical Model of an Electronic Unit by Analyzing Transient Processes in Its Control Nodes	201
<i>Valentina Ryabchenko, Mikhail Lankin</i>	
Decision-Making Support in Identifying Extremist Content on the Information and Telecommunications Network of the Internet	205
<i>A L Serobabova, L A Denisova</i>	
Virtual Cloud Laboratory Organization for the Professional Competencies Development in Training Future it Specialists of the Network and System Administration	210
<i>A. M. Shabalin, A. A. Zaharov, E. A. Kaliberda, N. V. Kenzhalinova</i>	
Electromagnetic Sensor for Kilns Rotation Control	215
<i>A. G. Shkaev, D. G. Lobov, A. A. Valke, D. B. Ponomarev, A. A. Shkaev</i>	
Research and Classification of Eating Behavior Patterns of Cattle Using a Convolutional Neural Network.....	218
<i>D. Shloma</i>	

Spectral Characteristics of Nonlinear System Output Under Stochastic Resonance	223
<i>A. S. Tabakova</i>	
Development of a Procedure for Improving the Effectiveness of Personal Identification Systems Based on the Analysis of Facial Images	228
<i>A. A. Tatarkanov, A. A. Umyskov, V. Zh. Kuklin</i>	
Frequency Method of Regulating the Speed of an Asynchronous Motor as a Simulator of a Wind Wheel of a Wind Power Generator	233
<i>A. S. Tatevosyan, A. A. Tatevosyan, N. V. Zakharova</i>	
Experimental Study and Calculation of Characteristics of Magnetolectric Synchronous Generator Based on Asynchronous Machine.....	237
<i>A. S. Tatevosyan, A. A. Tatevosyan, N. V. Zakharova</i>	
On Modeling the Assessment of the Security of Information Resources in a Telecommunications Network of Centrally Protected Objects.....	241
<i>A. V. Telny, V. A. Vilkoval, R. S. Chernikov, E. A. Matveeva, M. Yu. Monakhov</i>	
Computer Modeling of Graphene Moiré Pattern on Al(111) Surface.....	246
<i>I. V. Tikhomirov, E. V. Bogdanova</i>	
Increasing the Accuracy of Building Spatial Depths Maps in an Active-Pulse Television Measuring System Using Digital Image Filtering	250
<i>A. A. Tislenko, T. M. Akaeva, N. Borodina, V. V. Kapustin</i>	
Application of the Catboost Gradient Boosting Method in Forecasting Solar Electricity	255
<i>D. Vasina, A. Gorshenin</i>	
Experimental Study of Ion Thruster by Time-Of-Flight Method	260
<i>I. S. Vavilov, P. S. Yachmenev, V. V. Fedyanin, K. I. Zharikov, A. I. Lukyanchik, P. V. Stepen</i>	
Determination of the Power of the Microwave/HF Losses in the Toroidal Resonator of the Accelerator Ion Thruster by Its Frequency Spectrum.....	264
<i>I. S. Vavilov, P. S. Yachmenev, V. V. Fedyanin, K. I. Zharikov, A. I. Lukyanchik, P. V. Stepen</i>	
Utilizing a Genetic Algorithm for Optimization of Two-Impulse Rendezvous Maneuvers Between Spacecraft in the Martian Orbit	270
<i>S. Veisi, V. V. Lyubimov</i>	
On the Stability of the Chebyshev Iterative Method	275
<i>Y. N. Zakharov, A. I. Zimin</i>	
Development of an Algorithm for Recognizing Nanoparticles in Electron Microscope Images.....	280
<i>A. L. Zhiznyakov, Y. Y. Kulkov, V. A. Emelyanov</i>	
Commutative Transformations in Multi-Model Databases.....	283
<i>S. V. Zykin, V. S. Zykin</i>	

Author Index