

2023 7th International Conference on Information, Control, and Communication Technologies (ICCT 2023)

**Astrakhan, Russia
2-6 October 2023**



**IEEE Catalog Number: CFP23DB6-POD
ISBN: 979-8-3503-4095-2**

**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:	CFP23DB6-POD
ISBN (Print-On-Demand):	979-8-3503-4095-2
ISBN (Online):	979-8-3503-4094-5

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

AUTHORS	ARTICLE TITLE	Pages
Title		1
Preface		2
Evgeniy A. Pavlukhin, Igor Y. Kinzhagulov, Alexey V. Fedorov, Magomed A. Omarov	Automated ultrasonic testing of carbon-carbon composite materials	3-5
Konstantin Mortin, Yulia Golovko, Alyona Pogozeva, Alexey Rybakov	Development of hardware-software complex of vision system for detection of sheet metal rolling defects on lighted and noisy images	6-12
O. I. Dranko, I. A. Stepanovskaya, A. S. Bogomolov	Labor Productivity Variations: Big Data Analysis	13-17
V.I. Goncharenko, A.A. Dzekalo	The algorithm for constructing the UAV route based on the combined method	18-21
Artem Dyachenko, Andrey Kokuev	Application of a mobile application to control and analyze the acquired data of a shaft torsional vibration detection device based on microelectromechanical accelerometers	22-25
Alexander S. Sovlukov, Victoria V. Yatsenko, Alexander V. Kaychenov	Radiofrequency Method for Measurement of Interface Position between two dielectric Media in a Reservoir independently on their dielectric Permittivities	26-29
Galina Pikina, Daniil Suslov, Fedor Pashchenko	The method of negative correlation as an effective means of processing an experiment to determine the frequency characteristics of an object	30-34
Daniil Yu. Matveev, Daniil Yu. Tripolitov	Visualization of Abrikosov Vortices in High-Temperatures Cuprate Superconductors of the BSCCO-2212 Type	35-38
Pavel Yu. Buchatskiy, Stefan V. Onishchenko, Semen V. Teploukhov, Kirill A. Kuzmin	Modeling of geothermal heating system for an individual heating station	39-43
Dmitriy Starov, Victoria Koryakova, Paa Kwabena, Mikhail Gladyshev	Control Method for an Autonomous Group of Multi-Rotor Aircraft	44-47
Oleg M. Demidenko, Natallia A. Aksionova, Andrei V. Varuyeu	Challenges at the stage of simulation experiment planning	48-51
Andrei V. Varuyeu, Oleg M. Demidenko, Natallia A. Aksionova, Aliaksandr I. Kucharau	Implementation of the identification and recognition system cognitive behavior of the observed	52-56

Natallia A. Aksionova, Oleg M. Demidenko, Andrei V. Varuyeu, Denis S. Sych	Modification of the Canny edge detector for recognition of image markers of architectural plans	57-62
Oleg V. Stukach, Ivan A. Ershov, Sergey V. Bykov, Igor V. Trubin	Simulation and Device for the Ultrasonic Telemetry Channel in Drill String with Fluid	63-65
Vasiliy Bezmenov, Andrey Sokolov	Development of a wheeled pneumatically controlled vehicle for robotic complexes	66-68
Vladimir Tsyganov	Mechanism of Energy Saving in Production with Double Machine Learning	69-73
Dmitry Feofilov	Evaluation of convergence of neural network regulators training methods	74-77
Dmitry Khapkin, Sergey Feofilov, Andrey Kozyr	Method for the synthesis of stable autonomous neural network control systems for objects with limiters	78-82
Asim M. Kasimov, Alexander I. Popov, Anastasia S. Khoryakova	Measurements of Technological Process Parameters by Jet Multivibrators	83-87
Vladimir Toporovsky, Ilya Galaktionov, Alexis Kudryashov, Vadim Samarkin, Anatoliy Malykhin, Alexander Panich	Optimization of piezoceramic material parameters for stacked-actuator deformable mirror in free-space communication applications	88-92
Adnan F. Alhaj Hasan, Valeriy A. Semenyuk, Talgat R. Gazizov	Exploring the Impact of Triple Modal Reservation on Radiated Emissions: Experimental Insights for PCB Manufacturing	93-98
Alexander S. Sovlukov	Coaxial Waveguide Resonators as Sensors of Physical Properties of Dielectric Liquids	99-102
Nickita Potapov, Alexandr Kaychenov, Ilya Selyakov	Application of Correction Methods for Measured Data from a Model Object's Microclimate Monitoring System	103-106
Igor A. Savoskin, Irina V. Sibikina, Nadezhda V. Davidyuk, Irina M. Kosmacheva, Sergey V. Belov	Investigating of the degree of distortion of full-color images during digital watermark's embedding by the method of discrete transformations and the efficiency of its extraction	107-111
Nikolay V. Goloburdin, Vladislav S. Bakaev, Artem A. Bykadorov, Tatyana Y. Gladkikh, Artem O. Vinokurov, Konstantin A. Kulagin	Planning the trajectory of a manipulator robot for a set of configurations in joint space	112-116

G F Karlova, B I Avdochenko, E A Belozyorova	Active Magnetic Radar Systems based on Hall-Effect Sensors	117-120
Andrey Kozyr, Sergey Feofilov, Dmitry Khapkin	Synthesis of Neural Network Compensation of an Autonomous Electro-Hydraulic Actuator Based on a Sliding mode control	121-124
Vadim Agafonov, Ivan Egorov, Ekaterina Agafonova, Mikhail Kirillovichev	Self-noise of the planar type electrochemical motion sensor with carbon electrodes	125-129
Alexander Zeifman, Ilya Usov, Anastasia Kryukova, Yacov Satin, Galina Shilova	On the Approach to Obtaining Perturbation Bounds for a Class of Birth-Death Processes	130-135
Balakin Dmitry, Akhmetzianova Aisha	Application of the principles of the generalized spectral-analytical approach for image processing of RTM diagnostics thermograms	136-139
Andrey V. Balabanov, Anastasia A. Mamontova, Alexander A. Sukhorukov	Research of Free Oscillations of Membranes by Means of Microfluidic Pulses	140-143
Vyacheslav V. Konyashov, Alexey S. Sergeev, Oleg A. Kolganov, Alexey V. Fedorov, Kseniya A. Konyashova, Vladimir V. Bychenok	Study of the applicability of the method of optical triangulation for evaluation of the geometric parameters and cleanliness of the surface of products of complex shapes	144-149
Elaman Kidiraliev, Roman Lavrenov	Stereo visual system for ensuring a safe interaction of an industrial robot and a human	150-155
Dmitry Khablov	Development of a Path-Tracking Control System Model for an Indoor Mobile Robot Using Odometers and Microwave Sensors	156-159
Aidar Zagirov, Elvira Chebotareva, Tatyana Tsoy, Edgar A. Martínez-García	A New Virtual Human Model Based on AR-601M Humanoid Robot for a Collaborative HRI Simulation in the Gazebo Environment	160-163
Ed Heiss, Andrey Kozyr, Oleg Morozov	The Root-Mean-Square Velocity Stabilization of Swarm Multicopters Interacted by the Thermal Motion Equivalent Method	164-167

Alexander S. Sipin, Andrey N. Kuznetsov, Alexander S. Rusakov, Mikhail M. Khapaev, Vasily I. Savelyev	Random Walk based Parasitic Resistance Extraction	168-173
Ramir Sultanov, Roman Lavrenov, Shifa Sulaiman, Yang Bai, Mikhail Svinin, Evgeni Magid	Object detection methods for a robot soccer	174-178
L.I. Filinkov, A.M. Likhter, R.V. Nazarkin	Developing a Modern Automatic Boiler Control System	179-182
Alexander Dubelschikov, Tatyana Tsoy, Hongbing Li, Evgeni Magid	IoT Cameras Network Based Motion Tracking for an Unmanned Aerial Vehicle Control Interface	183-185
Alexander V. Andryushin, Alexey V. Neklyudov, Julia Y. Yagupova, Anna V. Kuznetsova, Berredjem H.Ilyes, Anatoly A. Kosoy	Optimization of heat and electricity load distribution under a given composition of generating equipment	186-191
Anastasia A. Mamontova	Development of Tools for Experimental Research of Main Functional Characteristics of Seven-stage Microfluidic Generator	192-194
Igor Bogachkov, Nikolay Gorlov	Monitoring of Operational Parameters of Optical Telecommunication Systems' Physical Channels	195-199
Dmitriy Kuzivanov, Kseniya Stepanova, Maxim Lobastov, Alexey Fedorov, Igor Kinzhagulov	Analysis of Acoustic Emission Parameters During the Control of Samples at Their Direct Laser Melting	200-202
E.K. Arakelyan, A.V. Andriushin, F. F. Pashchenko, S.V. Mezin, K.A. Andriushin, A.A. Kosoy	Development and Application of Digital Models of CCGT Equipment to Account for the Influence of Outdoor Air Temperature on the Choice of Optimal CCGT Operating Modes	203-206
Denis Kutuzov, Alexey Osovsky, Dmitriy Starov, Nataliya Maltseva, Vladimir Esaulenko	Simulation Model for Controlling the Processing of Information Packets by a NoC Router	207-210
Vladislav Litvinov, Kristina Litvinova, Alexey Tarakanov	On One Solution Of The Problem Of Vibrations Of Mechanical Systems With Moving Boundaries	211-215
Stanislav A. Yamashkin, Ekaterina O. Yamashkina, Anatoliy A. Yamashkin	Geoportals as a Problem-oriented Solution for Territorial Systems Management	216-220
Maksim S. Gubin, Valeriy V. Malyy, Alexey V. Fedorov, Igor Y. Kinzhagulov, Dmitriy S. Sergeev	Analysis of scanning schemes of complex-profile products with automated complex non-destructive quality control of coating of complex-profile product	221-224

Sergey V. Frolov, Artem A. Korobov, Kristina S. Savinova, Anton Yu. Potlov	Application of the method of gradient neural network control in bioengineering systems	225-228
Oleg Kolganov, Roman Egorov, Alexander Ilyinsky, Alexander Khoshev, Igor Kinzhagulov, Alexey Fedorov, G. N. Lukyanov	Development of an algorithm for calculating the parameters of the primary sensor transducer for a dynamic indentation device	229-233
Olga Blinova, Ekaterina Pankratova, Mais Farkhadov	Modern systems for working with scientific information and conducting research projects	234-238
Valeriy V. Malyy, Maxim S. Gubin, Alexandr S. Kostyukhin, Alexey V. Fedorov, Igor Y. Kinzhagulov	Development of an Algorithm for the Movement and Adjusting Measuring Transducers of an Automated Non-Destructive Testing System	239-244
Tsygankov Y.A., Kovriznich Y.A., Smirnov D.A., Poleshchenko D.A.	Application of machine learning methods to determine the moment of slag expiration in the steelmaking unit "steel ladle-intermediate ladle"	245-249
Kuanishev Valery Taukenovich, Burumbaev, Adil Ilmirovich, Barbin Nikolai Mihailovich	Analysis of spectra when measuring the electrical conductivity of water	250-254
Evgeniy A. Lesiv, Konstantin A. Vytovtov, Elizaveta A. Barabanova	Neural network algorithm of video analysis for backup local navigation system of tethered UAVs with training on synthetic data	255-259
Pavel V. Mizinov, Natalia S. Konnova, Milana O. Sharikova	Exploring the potential of NIR reflective and NIR absorptive materials in the manufacture of attack tools for biometric systems	260-265
Alexey Shmakov, Alexey Fedorov, Irina Alifanova, Vladimir Bychenok, Igor Berkutov	Ultrasonic quality control of polymer composite coatings	266-270
Ekaterina Zubova, Alexey Pakhalev, Maksim Shamshin, Konstantin Mortin, Mihail Gladishev	Application of methods for detecting the boundaries of an object in an image to search for a pilot line	271-274
Dmitriy Poleshchenko, Vladislav Petrov, Ilia Mikhailov	Development of a System for Automated Control of Planting Density, Leaf Area Index and Crop Development Phases by UAV Photos	275-280
Olga Blinova, Oleg Kuprikov, Mais Farkhadov	Analysis of frameworks and technologies for solving big data storage and processing problems in distributed systems	281-284

M. P. Kalibabchuk	Development of Microfluidic Amplifier with Preset Output Signal	285-287
Ed Heiss, Oleg Morozov, Andrey Kozyr	Thermal Motion Equivalent Method Application for Multicopter Swarm in Exploration Task	288-292
Stepan Bratchikov	Modern approaches for equipment's technical state prediction	293-295
Cherkasov Kirill Vyacheslavovich, Meshkov Sergey Anatolevich, Makeev Mstislav Olegovich	Study of resonant-tunneling diodes' design parameters' technological errors' effect on the parameters of diodes' equivalent circuits	296-299
Alexander G. Cherevko, Artem I. Ivanov, Irina V. Antonova	The variation in active layer resistance as a way to vary the electrodynamic characteristics of graphene antennas	300-302
Petr N. Shkatov	Innovative Surface Eddy Current Probe for Non-Destructive Testing	303-305
Podlazov V	A non-blocking system-area network with multiple direct channels	306-313
V.V. Krutskikh, A.N. Ushkov, A. I. Chernikov, N.O. Strelkov, A. E. Mirzoyan	Application of NRD-waveguide in the EHF band with a dielectric rod based on a GaAs semiconductor	314-320
V.V. Krutskikh, A.N. Ushkov, A. I. Chernikov, H. Arikat, A. E. Mirzoyan	Evaluation of the study of dielectric and metal-dielectric waveguides using digital twins under modern conditions	321-327
Alexander Khoshev, Oleg Kolganov, Roman Egorov, Alexey Fedorov, Igor Kinzhagulov	Computer simulation of registration of indenter motion in the process of contact-impact interaction	328-331
Konstantin D. Rusakov, Tatiana Ya. Gladkikh, Aleksey V. Grafenkov, Nikolay A. Mostakov, Nikolay V. Goloburdin, Andrey N. Migachev	Drowning Detection Algorithm in Coastal Zones	332-336
Irina Bondareva, Oleg Protalinskiy, Anna Khanova, Evgeniya Nesterova, Anastasiya Belova	Ontological Decision Support Model for Cargo Port Risk Management	337-339
Konstantin Vytovtov, Elizaveta Barabanova, Vladimir Vishnevsky, Georgiy Vytovtov, Evginiy Lesev	Local Radar Navigation System for Tethered HighAltitude Platforms	340-344
Sekou Diane, Konstantin Vytovtov, Elizaveta Barabanova	Analytical and neural processing of multispectral images for identification of water pollution	345-349

Vladimir Vishnevsky, Elizaveta Barabanova, Konstantin Vytovtov, Nikita Kalmykov	System of Synchronous Movement of High-Altitude Unmanned Platform and Ground Vehicle	350-353
Svetlana Volkova	The use of neural networks in the problem of forecasting stock prices	354-357
E.A. Barabanova, K.A. Vytovtov, S.E. Kazakov, E.V. Shalimova	Calculating Local Control Devices of 64x64 - All-Optical Switch	358-362
Ivan Molotov, Dmitry Dunikov, Oleg Protalinsky, Sergey Mezin, Pavel Polyakov, Ilya Paramonov	Static Model of the Control System for Balancing the Power of Solar-Wind Generation with Hydrogen Energy Storage in Order to Ensure Reliable Stand-Alone Power Supply	363-368
Burumbaev Danil Ilmirovich, Kuanishev Valery Taukenovich, Barbin Nikolai Mihailovich	A Cell for Determining the Parameters of an Optical Signal in Various Media. I. Air	369-372
Yuri Nikitjuk, Vladislav Prokhorenko, Alina Semchenko, Dmitry Kovalenko	Multi-Criteria Optimization of Quartz Glass Laser Cleaving Parameters via Neural Network Simulation and Genetic Algorithm	373-375
Rakesh Kumar, Sapana Sharma, Pradeep Singh	A Queuing Model for Computer-Communication Network under Catastrophic Events and Retransmission of Dropped Packets	376-379
Dharmaraja Selvamuthu, Anisha Aggarwal	Energy Analysis for the Base Station: Analytical Approach	380-384
Dharmaraja Selvamuthu, Aman Chauhan, Avadhesh Prasad, Priyanka Kalita, Anisha Aggarwal	Energy provision management in hybrid AC/DC microgrid connected base station in 5G cellular networks	385-391
Irina Petrova, Viktoriya Zaripova, Yuliya Lezhnina, Damir Gimatdinov	Principles of Conceptual Design of Memristive Biosensors	392-394
A.A. Khitrovo	Using a Positional Turbine Pneumatic Actuator with a Jet Control System	395-396
Luidmila Skripko, Anastasia Skripko	Automated Control System for Large Greenhouses and Fish Farms	397-399
K. A. Vytovtov, M. G. Ivanov	Estimation of an Optical NxN Switch with Decentralized Control in the Gaussian Beam Approximation	400-403

<p>Kuimov Evgeny Vladimirovich, Vetrova Natalia Alexeevna, Meshkov Sergey Anatolyevich, Fedorkova Nina Valentinovna, Luneva Lubo, Makeev Mstislav Olegovich</p>	<p>Interelectronic Scattering in a Model Taking into Account the Parasitic Resistance of a Heterostructure Resonant Tunnel Diode</p>	<p>404-406</p>
<p>Sergei Khakhomov, Alina Semchenko, Larisa Sudnik, Dmitry Kovalenko, Vladimir Gaisun, Andrei Boiko, Alexander Maevsky, Konstantin Danilchenko, Vladimir Pilipenko, Dmitry Belorusev, Galina Chucheva</p>	<p>Synthesis and Study of High-Performance Ferroelectric Materials for Advanced Non-Volatile Memory Devices</p>	<p>407-410</p>
<p>Elizaveta Barabanova, Georgii Vytovtov</p>	<p>Atmospheric Optical Channel Based on Tethered High-Altitude Unmanned Platforms</p>	<p>411-414</p>