

## Section 1 "Computer Optics and Nanophotonics"

(Chairs Roman Skidanov and Elena Achimova)

Section secretary: Sofiya Ganchevskaya

### Oral Session

<b>Veronika Blank, Roman Skidanov</b> <i>Hyperspectrometer based on a harmonic lens with diffraction grating</i>
<b>Baryshev Stepan, Alexey Kuznetsov and George Krasin</b> <i>Magnetic information sensing based on magneto optic plasmonic nanostructure</i>
<b>Safaa Mohammed Ridha Hussein Hussein, Sergey Khartono and Vladnr Pavelyev</b> <i>Calculation of the band structure of a nonchiral semiconductor and metallic carbon nanotubes</i>
<b>Vladislava Bulgakova, Vasily Gerasimov, Boris Goldenberg and Aleksei Lemzyakov</b> <i>Terahertz localized surface plasmons on subwave metal structures</i>
<b>Anna Skidanenko, Leon Avakyan, Maximilian Heinz and Lusegen Bugaev</b> <i>The method of structural study of aggregates of plasmonic gold nanoparticles by Uv/visible spectroscopy</i>
<b>Ekaterina Aldebeneva, Sergey Kharitonov, Vladimir Pavelyev, Nikolay Kazanskiy and Vadim Davydenko</b> <i>Simulation of the carbon nanotubes band structure on a supercomputer based with ab initio methods</i>
<b>Igor Glukhov and Sergey Moiseev</b> <i>Optical generation in an amplifying photonic crystal with metal nanoparticles</i>
<b>George Krasin, Michael Kovalev, Sergey Odinkov, Artem Solomashenko and Yury Fedotov</b> <i>Optical wave fields measurement by digital holography methods</i>
<b>Mariya Shishova, Dmitriy Lushnikov, Alexander Zherdev and Nikita Stsepuro</b> <i>Diffraction gratings applied in interferometric linear displacement encoders</i>
<b>Vladimir Khomutov and Ruslan Shimansky</b> <i>Error correction of the angular coordinate of circular laser writing systems in the diffraction structures manufacture with arbitrary topology</i>
<b>Sofiya Ganchevskaya and Roman Skidanov</b> <i>Modified method of direct laser writing radially symmetric structures.</i>
<b>Michael Kovalev, Paul Ruchka and Nikita Stsepuro</b> <i>Discrete representation of holograms of half-tone objects</i>
<b>Peter Zavyalov, Elena Zhimuleva, Leonid Finogenov, Maxim Kravchenko, Mark Savchenko, Vladimir Karlin and Alexey Beloborodov</b> <i>Using diffractive optical elements to inspection the geometric parameters of industrial products</i>
<b>Yulia Khristoforova, Ivan Bratchenko, Dmitry Artemyev, Oleg Myakinin, Alexandr Moryatov, Oleg Kaganov, Sergey Kozlov and Valery Zakharov</b> <i>Multivariate analysis of skin neoplasms AF and Raman spectroscopy features</i>
<b>Vladimir Burdin, Anton V. Bourdine, Oleg G. Morozov, Artem A. Kuznetsov and Anton M. Yudakov</b> <i>In-fiber device for modes division</i>
<b>Pavel Khanevich, Sergey Odinkov, Sergey Donchenko and Sergey Semishko</b> <i>Development and results of an experimental study to the angle guidance algorithm for optical reading device system for holographic memory</i>

<p><b>Veronika Blank, Roman Skidanov and Vladimir Podlipnov</b>  <i>A dual-range diffraction grating for imaging hyperspectrometr based on the Offner scheme</i></p>
<p><b>Anastassiya Kireeva and Rudenok Igor</b>  <i>Special wave solutions in the theory of waves of a mixed spectrum in planar gradient bianisotropic nanocrystalline structures</i></p>
<p><b>Elena Kadomina, Evgeni Bezus and Leonid Doskolovich</b>  <i>Low-scattering Bragg gratings for surface plasmon polaritons</i></p>
<p><b>Elena Kozlova, Viktor Kotlyar and Dmitry Kozlov</b>  <i>Analysis of dielectric circular cylinder light spot narrowing by whispering gallery modes and influence of material absorption</i></p>
<p><b>Artem Turov, Nikolay Balbekin, Maksim Kulya and Nikolay Petrov</b>  <i>Method for increasing the view field of THz holograms</i></p>
<p><b>Vladimir Podlipnov, Roman Skidanov and Veronika Blank</b>  <i>Experimental study and calibration of the imaging hyperspectrometer based on the Offner scheme</i></p>
<p><b>Serguei P. Murzin, Gerhard Liedl, Robert Pospichal and Alexey A. Melnikov</b>  <i>Study of the action of a femtosecond laser beam on samples of a Cu-Zn alloy</i></p>
<p><b>Andrey Rastorguev, Sergey Kharitonov and Nikolay Kazanskiy</b>  <i>Modeling and estimation of permissible technological errors in the arrangement of optical elements for the hyperspectrometer according to the Offner's scheme</i></p>
<p><b>Fedor Sidorov, Mark Bruk, Eugene Zhikharev and Alexander Rogozhin</b>  <i>Fabrication of microlens arrays and planar photonic crystals using thermal amplification of resist</i></p>
<p><b>Sergey Stafeev, Anton Nalimov, Maria Kotlyar, Liam O'Faolain and Victor Kotlyar</b>  <i>Binary subwavelength gratings for polarization control</i></p>
<p><b>Vladimir Sokolov</b>  <i>For the Jubilee of Professor Nikolay L. Kazanskiy</i></p>
<p><b>Vladimir Sokolov</b>  <i>The anniversary of 25 years of the of the Image processing systems institute of the Russian academy of sciences</i></p>
<p><b>Denis Kudryashov</b>  <i>Formation, development and features of the promotion of the English-language special issues of the journal "Computer Optics"</i></p>

### Poster Session

**Vladimir Abramov, Dmitriy Klyuev, Dmitry Mishin and Oleg Osipov**

The optical waves propagation in planar periodic inhomogeneous chiral structures

**Eugene Bashkirov and Maria Guslyannikova**

Entanglement between artificial atoms and photons of lossless cavities

**Eugene Bashkirov, Anatoly Vorobiev and Alexander Gorokhov**

Calculation of the information transfer from one node to another one in the theory of quantum networks on the basis of generalized Tavis-Cummings models

**Lidiia Bolbasova**

Calculations of efficiency of adaptive optical system for atmospheric turbulence compensation

**Anton Bourdine, Dmitry Artemyev, Ivan Bratchenko, Alexander Evtushenko, Vadim Kazakov, Ivan Karpitsov, Michail Kartashov, Anastasia Lykina, Julia Litvinova and Valery Zakharov**

Development of alternative fiber optic Raman probes based on optical fibers with written precision micro-structure defects

**Muhammad Ali Butt and Sergey Degtyarev**

Asymmetric double high mesa slot waveguide to enhance the light confinement in a 90° sharp bend

**Sergey Degtyarev and Svetlana Khonina**

Forming and focusing of fractional-order cylindrical beams with subwavelength gratings

**Alexey Dzyuba**

Wavefront recognition by the image of intensity in the focal plane based on the convolutional neural networks.

**Sergey Fomchenkov**

Modeling and manufacture of an interference filter with a defective layer for narrow spectral selection

**Maxim Galkin, Pavel Nosov, Mikhail Kovalev and Nina Verenikina**

Features of solving diffraction problems using the software Mathematica

**Maxim Gaponov, Vitold Pozhar, Aleksandr Machikhin and Sergey Shirokov**

Preliminary testing of acousto-optical hyperspectrometer for UAV

**Glazkova Anna and Maria Zablovskaya**

Astigmatic transformation of the Bessel beam and the Gauss–Laguerre beam

**Nikita Golovastikov, Dmitry Bykov, Evgeni Bezus and Leonid Doskolovich**

Three-layer diffraction structure for spatiotemporal differentiation of optical signals

**Arseny Golovin and Anatoly Demin**

Optical-digital complex for remote mine detection and mapping of minefields

**Alina Gornostay**

Mathematical models of image formation from the eye with diffractive intraocular lens

**Alexander Gorokhov and Andrey Kryukov**

Symmetry and quantum control of Rydberg atoms dynamics

**Vladimir Saleev and Alexandra Shipilova**

Modeling of photoelastic properties of Lithium Niobate crystal in the density functional theory

**Roman Sergeev and Michael Osipov**

Processing of images of speckle interferograms for determining the temperature coefficient of linear expansion

**Artem Kapustin**

DOEs for white light based on Bragg gratings with defect layer

**Sergei Karpeev, Martin Rojas and Vyacheslav Paragin**

Tunable generator of radially and azimuthally polarized Bessel beams based on the interference polarizer

**Vladimir Kazakevich, Pavel Kazakevich, Pavel Yaresko and Daria Kamynina**

The synthesis of metallic nanoparticles by laser ablation in heavy water method

**Sergey Kharitonov, Svetlana Khonina, Nikolay Kazanskiy and Yury Strelkov**

Simulation of radiation propagation in curvilinear optical lightguides using the method of variables separation

**Pavel Khorin**

Modeling of photoelastic properties of Lithium Niobate crystal in the density functional theory

**Mikhail Kirilenko and Sergey Volotovskiy**

Calculation of the axially symmetric eigenfunctions of the finite propagation operator in the near-field diffraction

**Victor Kotlyar and Anton Nalimov**

Engineering a sector-variant high-numerical-aperture micrometalens

**Victor Kotlyar, Alexey Kovalev and Alexey Porfirev**

Controlling the orbital angular momentum of Gaussian vortices by shifting the point of phase singularity

**Svetlana Kotova, Aleksandra Mayorova, Evgeny Pozhidaev and Sergey Samagin**

Simulation of spatial phase light modulators based on the ferroelectric liquid-crystals

**Elena Kozlova, Victor Kotlyar and Alexandra Savelyeva**

Laser light focusing by microcylinder with two metallic shells

**Stanislav Krasnov and Sergey Kharitonov**

Research of the passage of mode pulses in a waveguide with a one-dimensional diffractiongrade

**Anton Krents and Nonna Molevich**

Transverse patterns in broad-area lasers with anisotropy

**Dmitry Kuzmin, Alexander Betin and Sergey Odinkov**

Investigation of the exposure characteristics of Photo-Thermo- Refractive glasses to the recording of holographic and diffraction gratings was studied.

**Latukhina Natalya, Lizunkova Daria, Paragin Vyacheslav and Rogozhina Galina**

The influence of technological parameters on the optical properties of photosensitive structures based on porous silicon

**Michael Limov, Michael Osipov, Natalia Znamenshchikova, Dmitry Gnutov and Alexey Linkov**

Processing the output signal from the speckle interferometer on a single speckle under the impact of noise

**Anastasia Lykina, Dmitry Artemyev, Vladimir Kukushki, Ivan Bratchenko, Nikolay Aleksandrov and Valery Zakharov**

Raman spectroscopy for kidney tissue and its neoplasms research

**Andrei Mezhenin, Yuliya Kurenkova and Anastasiya Rymzhina**

Diagnostic stand for quality control of diffractive optical element manufacturing

**Natalya Moiseeva and Anton Moiseev**

Matrix WKB solution for electromagnetic waves in an inhomogeneous gyrotropic medium

**Evgeny Monin and Sergey Volotovskiy**

Modelling of distribution of circular beams of airy in parabolic fiber

**Serguei P. Murzin, Maxim V. Blokhin and Sergei A. Afanasiev**

Pulse-periodic laser action to create an ordered heterogeneous structure based on copper and zinc oxides

**Liudmila Naiden, Ivan Tsyganov, Sergey Odinokov and Vasily Kolyuchkin**

Investigation of the method of forming multicolored images reconstructed from protective holograms

**Vladimir Pavelyev, Andrei Mezhenin, Nishant Tripathi, Yuliya Kurenkova and Prabhash Mishra**

Sensitive element of CNT-based IR-sensor

**Vladimir Podlipnov and Vsevolod Kolpakov**

Investigation of the annealing of CdTe films in an off-electrode plasma for photovoltaics

**Dmitry Savelyev**

Transformation of a Gaussian vector beam by an axicon with a subwave period

**Vladimir Saleev, Aleksandra Shipilova and Arthur Ernst**

Ab-initio modeling of structure stability and optical properties of perovskite  $\text{CsPbI}_{3-x}\text{Cl}_x$  depending on chlorine doping level

**Ekaterina Seledkina, Anatoly Demin and Anton Ekimenko**

Development of a hologram optical element for a lidar

**Lyudmila Shamina, Ivan Bratchenko, Dmitry Artemyev, Yuliya Khristoforova, Vladimir Grishanov, Dmitry Kornilin and Valeriy Zakharov**

Analysis of correlation between Raman and autofluorescence human skin response in visible and NIR region

**Artur Shilov, Sergei Miheev, Alexandr Sotsky, Maxim Nazarov, Luidmila Sotskaya, Kazbek Bzheumikhov and Zaur Margushev**

Photonic crystal fibers formed by air channels with a corrugated boundary

**Yaroslav Skidanov and Svetlana Honina**

Research of the possibilities of increasing the resolution of optical systems in the presence of aberrations based on amplitude apodization

**Larisa Stepanova and Vadim Dolgikh**

Interference-optical methods (digital photoelasticity method) for multi-parameter crack tip description: experimental determination of coefficients of the Williams asymptotic expansion

**Yury Strelkov and Ali Butt**

Modeling of a Fabry-Perot filter based on TiO<sub>2</sub> and air gap by using Eigenvectors and Eigenvalues approach

**Mohammad Talib and Prabhash Mishra**

A high performance optical detector using TiS<sub>3</sub> nanoribbons

**Andrey Ustinov**

Analytical features of the extended Airy beams

**Vadim Vasilev**

Calculation and modeling of harmonic lenses with variable height microrelief

**Vadim Vasilev and Vladimir Podlipnov**

Investigation of the possibility of using birefringent crystals for the formation of inhomogeneously polarized laser beams

**Tatiana Yakovleva**

Нелинейная фильтрация раисовских данных как инструмент фазовых измерений: аспекты теории

**Elizaveta Yarovna, Anton Krents and Nonna Molevich**

Impact of time-delayed feedback on optical field dynamics in cavity with nonlinear metamaterial

## **Section 2 "Image Processing and Earth Remote Sensing"**

*(Chair Vladislav Myasnikov and Valeriy Labunets)*

Section secretary: Victor Fedoseev

### **Oral Session**

<b>Valeriy Labunets, Victor Chasovskikh and Ekaterina Osthaimer</b> <i>Multiparameter Golay m-complementary sequences and transforms</i>
<b>Valeriy Labunets, Victor Chasovskikh and Ekaterina Osthaimer</b> <i>Multiparameter Golay 2-complementary sequences and transforms</i>
<b>Pavel Chochia</b> <i>Image Objects Detection with Local Topological Characteristics, Forming by Two-Dimensional Variations</i>
<b>Alexander Karkishchenko and Valeriy Mnukhin</b> <i>On eigenvectors of the discrete Fourier transform over finite Gaussian fields</i>
<b>Anna Smagina, Denis Shepelev, Egor Ershov and Anton Grigoryev</b> <i>Development of stereo-vision based methods for obstacle detection in road situation analysis</i>
<b>Artyom Makovetskii, Sergei Voronin and Vitaly Kober</b> <i>A fast total variation regularization algorithm for 2D piecewise constant radially symmetric functions</i>
<b>Anatolii Leukhin</b> <i>Detection of moving targets in SAR</i>
<b>Konstantin Kiy</b> <i>An Image Understanding System Based on Geometrized Histograms Method: Finding the Sky in Road Scenes</i>
<b>Alexander Tashlinskii and Galina Safina</b> <i>Optimization of recurrent algorithms for parameters estimation of image interframe geometrical deformations by the convergence rate of parameter estimates</i>
<b>Radik Magdeev and Aleksandr Tashlinskiy</b> <i>Objects identification accuracy for binary images</i>
<b>Mikhail Lange and Sergey Ganebnykh</b> <i>Group Decision Schemes for Classification with Reject in Ensemble of Image Sources</i>
<b>Evgeny Myasnikov</b> <i>Nonlinear dimensionality reduction of hyperspectral images based on spectral angles and exploiting the spatial context</i>
<b>Sergey Rylov and Igor Pestunov</b> <i>Fast hierarchical clustering of multispectral images and its implementation on NVIDIA GPU</i>
<b>Andrey Gaidel</b> <i>Methods of polynomial feature matching for textual images</i>
<b>Michael Khachay and Maxim Pasyukov</b> <i>Fingerprint image segmentation using neural networks</i>
<b>Dmitry Murashov and Fedor Murashov</b> <i>Локализация областей интереса на изображениях картин</i>
<b>Pavel Pahomov, Alexander Borusyak, Dmitry Vasin and Vadim Turlapov</b> <i>Context method of lossless compression of RGB- and multispectral images</i>
<b>Pavel Pahomov, Alexander Borusyak and Vadim Turlapov</b> <i>Investigation of noisy channels of the hyperspectral image by the method of empirical modes with the purpose of its compression</i>

<b>Nikita Andriyanov and Konstantin Vasiliev</b> <i>Use autoregressions with multiple roots of the characteristic equations to image representation and filtering</i>
<b>Konstantin Vasiliev, Vitaly Dementiev and Nikita Andriyanov</b> <i>Analysis of the efficiency of satellite image sequences filtering</i>
<b>Andrey Kuznetsov and Vladislav Myasnikov</b> <i>New scheme for fast copy-move detection</i>
<b>Ekaterina Serkova, Ivan Yakimchuk and Ilia Safonov</b> <i>Image-based method for porosity analysis of proppant particles</i>
<b>Ivan Konovalenko</b> <i>Error values analysis for inaccurate projective transformation of a quadrangle</i>
<b>Vladimir Mokshin, Ildar Saifudinov, Pavel Tutubalin and Leonid Sharnin</b> <i>Analysis of the model for highlighting notable structures in the solving problem of object detection in an image</i>
<b>Fedor Kornilov, Denis Perevalov, Victor Kostousov and Andrei Popel</b> <i>Digital surface model generation from satellite stereo imagery</i>
<b>Mukesh Boori, Rustam Paringer, Komal Choudhary, Alexander Kupriyanov and Rukmini Banda</b> <i>Comparison in hyperspectral and multi-spectral remote sensing data for land cover classification in Samara, Russia</i>

### Poster Session

**Anton Agafonov and Vladislav Myasnikov**

Autonomous vehicles routing in time-dependent transportation networks

**Anton Agafonov**

An algorithm for public transport departure time estimation on the basis of operation strategies

**Nikita Andriyanov and Vitaly Dementiev**

Application of mixed models of random fields for the segmentation of satellite images

**Sergej Belov**

Detection of changes of characteristics of the scattering Ability of superficial and subsurface structures of the earth in the short-wave range of radio waves.

**Aleksandr Borodinov and Vladislav Myasnikov**

Target recognition on SAR images based on a convolutional neural network

**Ruslan Brezhnev, Yuriy Maglinets, Ksenia Raevich and Gennady Tsibulskii**

Modelling of spatial objects of agricultural purpose with an inhomogeneous dynamically changing spatial structure

**Komal Choudhary, Mukesh Boori and Alexander Kupriyanov**

Remote sensing investigation of inundation, elevation and land use assessment in Moscow state, Russia

**Sergey Denisov and Mikhail Gashnikov**

Comparative study of hierarchical and differential methods of image compression



**Anna Denisova, Andrey Kuznetsov and Nikolay Glumov**

The technology of agricultural fields remote sensing images segmentation using morphological profiles

**Alexandra Dunaeva and Fedor Kornilov**

Building detection from satellite multispectral images using a digital surface model

**Nadezhda Evdokimova and Vladislav Myasnikov**

Detecting forgery of image time series based on the anomalies detection

**Anastasia Evstiforova and Anna Denisova**

The research of soil characteristics influence on the results of regression modeling of winter wheat yield using NDVI vegetation index

**Victor Fedoseev**

Hyperspectral satellite image classification using small training data from its own territory

**Mikhail Gashnikov and Aleksey Maksimov**

Parameterization of the nonlinear predictor invariant to four directions contours for digital image compression

**Mikhail Gashnikov**

Interpolation based on NEDI for image compression based on HGI

**Mikhail Gashnikov**

Use of ACF models for interpolation of images for compression on the basis of HGI

**Fatih Gazimzyanov and M. A. Al Akkad**

An Automated System for Evaluating the Composition Characteristics of 2D Images: concept, mathematical model, configuring algorithm

**Elizaveta Goncharova and Andrey Gaidel**

Greedy algorithms of feature selection for multiclass image classification

**Oleg Goriachkin and Alex Borisenkov**

Imaging in bistatic sar P and VHF bands with high spatial resolution

**Vladimir Gridin, Maxim Truphanov and Vladimir Solodovnikov**

Hippocampus detection and calculation of its characteristics in magnetic resonance imaging of the brain

**D.V. Karasev, A.N. Leukhin, V.I. Bezrodny, A.A. Voronin, K.V. Andreev, A.N. Ivanov**

Polyarity SAR system

**Ludmila Kavelenova, Evgeny Korchikov, Nataly Prokhorova, Anna Denisova, Darya Terentyeva and Victor Fedoseev**

Concerning the detection and ecological state evaluation of protective forest belts basing on complex ground survey and remote sensing data processing

**Angelina Kharchevnikova and Andrey Savchenko**

Convolutional Neural Networks in age/gender video-based recognition

**Yuri Kovalev, Kirill Kuptsov, Sergey Eremeev and Dmitriy Andrianov**  
Algorithm for encoding nD spatial objects into GIS

**Victor Krasheninnikov, Larisa Trubnikova, Olga Malenova, Anna Yashina, Marina Albutova and Olga Marinova**  
Algorithm for detecting block-like cracks in facies of human biological fluids

**Dmitrii Kraus, Roman Kovalenko and Alexander Tashlinskiy**  
Prediction of probability of estimations improvement on iterations of pseudo-gradient estimation of image parameters

**Igor Kudinov, Oleg Pavlov, Ivan Kholopov and Mikhail Khramov**  
Real-time multispectral video panorama construction

**Maria Kudrina and Vadim Mishenev**  
Wave skeletonization algorithm of raster images

**Yaroslav Kulkov and Sultan Sadykov**  
Recognition of the imposed flat objects on dimensionless marks of their contours

**Ekaterina Kurbatova**  
Edge detection of objects on the satellite images

**A.N. Leukhin, A.A. Rozentsov, V.I. Bezrodnyy, A.A. Voronin, D.Yu. Karasev, N.A. Kokovihina**  
3D synthetic aperture radar image

**Artem Lukoyanov, Dmitriy Nikolaev and Ivan Konovalenko**  
Modification of YAPE keypoint detection algorithm for wide local contrast range images

**Stella Lyasheva, Mikhail Medvedev, Mikhail Shleymovich and Vladimir Mokshin**  
The analysis of image characteristics on the base of energy features of the wavelet transform

**Artyom Makovetskii, Sergei Voronin, Vitaly Kober, Aleksei Voronin and Dmitrii Tihonkih**  
Approximation of the exact solution of point clouds registration based on point-to-plane approach for orthogonal transformations

**Kseniya Medvedeva**  
Comparison of the low-frequency Butterworth filter with radial-symmetric SE-filter

**Oleg Melsitov, Violetta Sherendak, Semyon Konovalov and Oleg Myakinin**  
Automatic Malignant Melanoma recognition using a Dermatoscopy Imaging Tool

**Alexei Morozov and Olga Sushkova**  
A Virtual Machine for Low-Level Video Processing in Actor Prolog

**Alexei Morozov and Olga Sushkova**  
On the Development of Methods and Algorithms Based on Object-Oriented Logic Programming for Video Monitoring of Laboratory Rats

**Sergey Mosin, Evgeny Dremov and Sergey Miroshnichenko**

Aircrafts' Localization and Classification on Remote Sensing Data with Convolution Neural Networks

**Alexander Naumov, Alexander Machikhin and Alexey Gorevoy**

Three-dimensional imaging of hard-to-reach objects by means of stereoscopic endoscopic probes

**Anatoly Novikov, Aleksey Efimov and Dmitry Kolchaev**

3D images superimposition in aviation vision systems

**Varvara Petrova**

Adaptation of face recognition systems to operating conditions using Simulink

**Yuliya Podgornova and Sultan Sadykov**

Detection of malignant breast tumors on the background of fibrocystic breast disease

**Stepan Potapov, Alexander Kupriyanov and Rustam Paringer**

Investigation of the segmentation of remote sensing images using the Kruskal method and the search for the same segments using perceptive hashing technology

**Denis Privezentsev, Arcady Zhiznyakov and Egor Pugin**

Development of fuzzy fractal representation of the image

**Vladimir Rozaliev, Yulia Orlova, Alexander Vybornyi and Aleksey Alekseev**

Program for controlling the correctness of physical exercises

**Alexey Ruchay, Konstantin Dorofeev and Vladimir Kolpakov**

Fusion of information from multiple Kinect sensors for 3D object reconstruction

**Alexey Ruchay, Konstantin Dorofeev and Anastasia Kober**

Accurate reconstruction of the 3D indoor environment map with a RGB-D camera based on multiple ICP

**Alexey Ruchay, Konstantin Dorofeev and Anastasia Kober**

Accuracy analysis of 3D object reconstruction using RGB-D sensor

**Mikhail Semyonov and Evgeny Myasnikov**

A comparison of iris image segmentation techniques

**Vladislav Sergeyev and Aleksey Maksimov**

Comparison of optimum reconstruction filters for discrete and continuous-discrete linear observation models

**Ekaterina Serkova, Ilia Safonov, Ivan Yakimchuk and Victoria Evstefeeva**

Unsupervised segmentation of ceramic proppant particles in 3D microCT images

**Ruslan Sharapov**

Using spatial-temporal maps for visualization of the karst development dynamics

**Lubov Shiripova, Olga Strukova and Evgeny Myasnikov**

Gait analysis for person recognition using principal component analysis and support vector machines

**Anastasiia Sokolova and Andrey Savchenko**

Data organisation in video surveillance systems using deep learning technologies

**Natalia Sorokina and Victor Fedoseev**

Spatio-Temporal Image Slices for Frame Cut Detection in Video

**Marina Turkova and Andrey Gaidel**

Correlative features for the classification of textural images

**Anna Varlamova and Andrey Kuznetsov**

Image splicing localization based on CFA artifacts analysis

**Pavel Volkhin, Violetta Sherendak and Oleg Myakinin**

A moving compensation algorithm for hyperspectral imaging

**Natalya Vorobiova and Andrei Chernov**

Comparing Bayesian classifier and a method based on algorithm for calculating estimates for crop identification by time-series Terra/MODIS 250 m

**Sergey Voronov, Ilya Voronov and Roman Kovalenko**

Comparative analysis of stochastic optimization algorithms for image registration

**Yuliya Vybornova**

Application of spatial interpolation methods for restoration of partially defined images

### **Section 3 "Mathematical Modeling of Physico-Technical Processes and Systems"**

(Co-Chairs Sergei Sazhin and Vladimir Sobolev)

Section secretary: Aleksei Archibasov

#### **Oral Session**

<b>Oleg Strashko, Ilja Kuznecov, Victor Dorofeev, Dmitriy Gocev</b> <i>The mathematical model of characteristics of the convective unstable atmosphere taking into account microphysical processes in clouds</i>
<b>Katerina Makoviy, Dmitriy Proskurin, Yuliya Khitskova, Yaroslav Metelkin</b> <i>A comparison of linear programming and the genetic algorithm approaches to the problem of optimizing the server hardware resources for hosting virtual desktops</i>
<b>Mikhail Stepanov, Andrew Stepanov</b> <i>Mathematical modelling of intelligent self-organizing systems: implementation of the mechanism of action planning</i>
<b>Andrey Solovyov, Mikhail Semenov, Peter Meleshenko</b> <i>Stabilization of inverted pendula system in presence of elastic bonds</i>
<b>Svetlana Korabelshchikova, Boris Melnikov, Svetlana Pivneva, Larisa Zyablitseva</b> <i>Linear error correcting codes and their application in DNA analysis</i>
<b>Grigory S. Voronkov, Igor V. Kuznetsov, Pavel E. Filatov, Albert Kh. Sultanov, Anna V. Voronkova, Irina L. Vinogradova</b> <i>Signals and messages differential transformation research for increasing multichannel systems efficiency</i>
<b>Dmitry Myasnikov, Konstantin Semenikhin</b> <i>Control of a queuing system with hidden Markov state</i>
<b>M.G. Matveev, A.V. Kopytin, E.A. Sirota</b> <i>Combined method for identifying the parameters of a distributed dynamic model</i>
<b>Leniza Enikeeva, Irek Gubaydullin and Sergey Khursan</b> <i>Numerical modeling of intramolecular transformations of orto-substituted aromatic nitrooxides</i>
<b>Irina Timina, Eugene Egov</b> <i>Application of the anomaly pattern in forecasting time series of project activity metrics</i>
<b>Alexander Kuznetsov</b> <i>Probabilistic properties of quasi-optimal trajectories of an agent moving over a lattice</i>
<b>Garnik Karapetyan, Heghine Petrosyan</b> <i>About the solvability of regular hypoelliptic equations in <math>R^n</math></i>
<b>Zhe Dong, Yuriy Zabolotnov, Changqing Wang</b> <i>Mathematical modeling and analysis of motion of low-orbital space tether system</i>
<b>Konstantin Khramov, Vladimir Romashov</b> <i>Mathematical modeling of operational modes of high-speed DACs</i>
<b>Innokentiy Semushin, Julia Tsyganova</b> <i>Off-the-beaten-path Solutions for Decomposition-based Zero-forcing Precoding in xDSL Multi-user Downlinks</i>
<b>Kamila Koledina, Sergey Koledin</b> <i>Interrelation between single-cycled catalytic reaction objective functions optimization and multi-cycled production on a basis of a kinetic model</i>
<b>Alexey Magazev, Valeria Tsyurulnik</b> <i>Optimizing the selection of information security remedies in terms of one Markov security model</i>

<b>Yuryi Kropotov, Aleksander Proskuryakov, Aleksey Belov</b> <i>Wavelet processing of time series to improve the accuracy of information representation</i>
<b>Mikhail Tsaryov, Dmitrii Kraus</b> <i>Reduction of the computational complexity of pseudogradient estimation of image parameters algorithms for a priori optimization of the local samples volume</i>
<b>V.S. Nozhkin, M.E. Semenov, I.I. Ulshin</b> <i>A stochastic model of the moisture motion in the atmosphere</i>
<b>Victor Zhidchenko, Kovartsev Alexander, Heikki Handroos, Iuliia Malysheva</b> <i>Digital twin for faster than real-time simulation of mobile crane operations</i>
<b>Vitaly Chernik</b> <i>Mathematical methods for holographic mask with layered structure synthesis</i>
<b>P.A. Meleshenko, O.O. Reshetova, A.V. Tolkachev</b> <i>Sine-Gordon system with hysteretic nonlinearity</i>
<b>Joseph Knapik, Roman Gallyamov, Valeriy Ovchinnikov, Kseniya Volkova, Evgeniy Avdeev</b> <i>F1 Car - Front Wing CFD Analysis and Optimization</i>
<b>Ilfat Bainazarov, Ilnur Akhmetov</b> <i>Mathematical model of process of production of phenol and acetone from cumene hydroperoxide</i>
<b>Vjacheslav Zakharov, Sergei Shalagin, Bulat Eminov</b> <i>Representation of Markovs functions on the minimal polynomials over a finite field</i>

### Poster Session

**Stanislav Abulhanov, Nikolay Kazanskiy, Dmitriy Goryainov, Yury Strelkov**

The effect of roughness and deformation of the reflecting surfaces of the LED spotlight on its lighting performance

**Ayna Agataeva**

Analysis of the threshold phenomena in a dynamic model of a fuel spray ignition

**Emil Akmerov, Mikhail Vovdenko, Irek Gubaydullin**

Methyl tert-butyl ether synthesis stimulation

**Igor Anikin, Khaled Alnajjar**

Increasing the quality of pseudorandom number generator based on fuzzy logic

**Igor Anikin, Khaled Alnajjar**

Studying the relationship between linguistic variables and the degrees of primitive polynomials used in pseudo-random number generator based on fuzzy logic

**Aleksei Archibasov, Andrei Korobeinikov**

Models of viral dynamics with random mutation

**Valery Bagmanov, Elizaveta Grakhova, Guzel Abdrakhmanova**

Ultra wideband vortex antenna array design for high capacity radio links

**Mikhail Balabaev**

Flow curvature method applied to the burning problem

**Eugene Bashkirov, Anatoly Vorobiev**

Entanglement between two dipole-coupled qubits interacting with a detuned thermal field

**Eugene Bashkirov**

Entanglement between two Rydber atoms successively interacting with a detuned cavity field

**Oksana Belova, Larisa Stepanova**

Estimation of crack propagation direction angle under Mixed-mode loading (Mode I and Mode II): generalized fracture mechanics criteria and atomistic modeling (molecular dynamics method)

**Valery Berdnikov, Jakob Mostovoi**

Analytical and numerical modeling of clusters of objects in a random environment

**Valery Berdnikov, Jakob Mostovoi**

Statistical modeling of a large network of nanosatellites

**Alexander Biryukov, Yana Degtyareva, Mark Shleenkov**

The modeling of multiphoton ionization by path integral approach

**Alexander Biryukov, Mark Shleenkov**

Entangled state lifetime of qubits in external fields calculation by path integral approach

**Igor Blatov, Elena Kitaeva**

Convergence of algorithms for adapting computational grids for elliptic singularly perturbed boundary value problems

**Igor Blatov, Boris Lihtsinder**

On the estimation of queue lengths when processing stationary series in queueing systems with arbitrary correlation

**Yuliya Bobreneva, Ainur Mazitov, Irek Gubaydullin**

Mathematical modeling of fluid flow processes in the fracture-porous reservoir

**Valery Bogdanovich, Mikhail Giorbelidze**

Development of the disperse powder material motion mathematical model in the boundary layer of plasma flow during plasma spraying

**Valery Bogdanovich, Mikhail Giorbelidze**

Development of the powder melting mathematical model in the technology of selective laser melting

**Michael A. Bolotov, Vadim A. Pechenin, Nikolay V. Ruzanov**

Prediction of the geometric parameters of products assemblies using neural network models

**Nikolay Bystrov, Irina Zhukova**

Estimation of signal-to-clutter-plus-noise ratio in presence of clutter clipping

**Alexander Chekashov, Olga Starinova, Bakhyt Alipova, Irina Gorbunova**

Modeling of solar sail surface oscillations during interplanetary flight

**Andrey Danilov, Nikita Andriyanov, Pavel Azanov**

Ensuring the effectiveness of the taxi order service by mathematical modeling of its work

**Elena Demyanenko, Alexandr Epifanov, Igor Popov**

Simulation of plastic forming process by variation of geometric parameters

**Pavel Dyshlovenko, Anastasia Batanova**

Energy and elastic constants of a charge-stabilized colloidal crystal with body-centered cubic lattice

**Alexandr Epifanov, Elena Demyanenko, Igor Popov**

Simulation of the deformation process taking into account the elastic comeback effect

**Julia Ermoshkina**

The investigation of stability in a model of the spread of viruses

**Maksim Fain, Olga Starinova**

Mathematical modeling of the space tug transfers between the Lagrange points of the Earth-Moon system

**Azamat Faskhutdinov, Ilnur Akhmetov**

Increase resource efficiency of the catalytic isomerization process by mathematical modeling

**Natalia Firstova**

Effect of random perturbations on critical phenomena in a dynamic model of an electrochemical reaction

**Julia Gerasimova**

Parallel algorithm of spline-based wavelet transform

**Dmitriy Gocev, Gennadii Zibrov, Vadim Zakusilov, Ilja Kuznetsov**

The mathematical model of stability of lining a vertical mine shaft to ensure environmental safety of production

**Sofia Gogoleva**

Preconditioning based on LU-decomposition in iterative methods for solving systems of linear algebraic equations with sparse matrices



**Oleg Golovnin, Tatyana Mikheeva**

Attribute-driven Network-centric Urban Transport Process Control System Modeling

**Alexey Golubkov, Andrey Tsyganov, Julia Tsyganova**

Adaptive estimation of an object motion parameters based on the hybrid stochastic model

**Yury Gorelov, Lyubov Kurganskaya, Vitaly Yurin**

Optimal scanning for curvilinear routes and geometrically complex area of sensing using optoelectronic observation equipment

**Yury Gorelov**

To the problem of optimum allocation of a physical control resource for a separate dynamic systems

**Boris Gorlach, Alena Mukhametzyanova**

Mathematical Modeling of Metal Forming Processes

**Igor Grigoryev, Svetlana Mustafina**

Simulation of the polymerization process of butadiene per neodymium catalytic system

**Dmitriy Ivanov, Ilya Sandler, Natalia Chertykovtseva**

Identification of dynamic errors-in-variables bilinear systems of fractional order

**Igor Kartashevskiy**

The model of the kernel of the Lindley integral equation based on selective functions

**Roman Khabibullin, Olga Starinova**

Mathematical modelling of the solar sail spacecraft three-dimensional motion in heliocentric coordinate system

**Maxim Khomenko, Fikret Mirzade**

Numerical investigation of capillary and thermocapillary phenomena at laser cladding

**Ekaterina Kiseleva**

Mathematical model of the process of functioning of the educational system

**Galina Klimashova, Alexandr Kovarcev**

Rules for the formation of initial approximations of the conformations of the atoms of Morse clusters on the basis of a geometrically grounded method

**Joseph Knapik, Roman Gallyamov, Valeriy Ovchinnikov, Kseniya Volkova,  
Evgeniy Avdeev**

LMP1 Hybrid car - analysis and optimization

**Alexander Kobrin, Vladimir Sobolev**

Decomposition of non-holonomic mechanics models

**Sergey Koledin, Kamila Koledina, Irek Gubaydullin**  
Heterogeneous catalytic reactions conditions optimization

**Yuriy Kropotov, Nataliya Holkina, Aleksander Proskuryakov, Dmitriy Beilekchi**  
Identification and estimation parameters of acoustic signals in telecommunication systems of audio exchange

**Darya Kuznetsova**  
Reduction of virus evolution model

**Olga Kuznetsova, Natalia Dodonova**  
Theoretical and game model for the limited resource distribution in the public procurement market

**Vladislav Lyubimov**  
Modeling of the Induced Resonant Torques during the Motion of an Asymmetric Spacecraft in the Atmosphere

**Natalja Moiseeva, Anton Moiseev, Igor Rudenok**  
The WKB 4x4 method for an inhomogeneous chiral layer

**Olga Mossoulina**  
Modeling of the random texture surface based on self-similar structures

**Oleg Naumov**  
Modeling the process of deployment of the space tether system using parallel algorithms

**Vladimir Nesterov**  
The concept of vector multicomponent physical quantities and its application

**Oleg Nikitin, Petr Polushin**  
The oppression of intersymbol interference by logical predistortion of transmitted signals

**Elizaveta Nikolaeva, Olga Starinova**  
Simulation of a system protect Earth from asteroid hazard by kinetic interceptor

**Sergey Novikov, Mariya Fedina**  
Equiangular tight frames in sparse signal processing

**Liana Nurislamova**  
Numerical simulation of gas flow dynamics of propane pyrolysis

**Vadim Pechenin, Nikolay Rusanov, Michail Bolotov**  
Model and software module for predicting uncertainties in coordinate measurements in the NX OPEN API

**Mikhail Piganov, Vladimir Maklashov**

Simulation of ultrawideband embedded multilayer RF filters embedded in a printed circuit board

**Mikhail Piganov, Dmitriy Novomeyskiy**

Process modeling of adjustment of thick film resistors by method of flare discharge

**Ruslan Pikalov, Vladimir Aslanov**

Rendezvous of two spacecraft in LEO with use tether

**Igor Rastorguev, Dmitriy Surkov**

Modeling of atmospheric convection using remote sensing data

**Darya Rogach**

Stability of measurable vectors for phaseless reconstruction

**Nikolay Ruzanov, Michael Bolotov, Vadim Pechenin**

Model for estimating the error in measuring geometric parameters of complex surfaces

**Kristina Saigak**

Modeling and analysis of electrodynamic rope system motion in near-earth orbit

**Vitalii Semin, Andrei Pavelev**

Simulation of non-Markovian dynamics of dipole-dipole interacting atoms

**Elena Shchepakina, Vladimir Sobolev**

Cheap control for quadrupler

**Elena Shchepakina**

Invariant surface with the change of stability in a neuron activity model

**Ekaterina Shchetinina**

Stability loss delay in a system with self-excited oscillations

**Kseniya Shirochenko, Alexander Safronov, Irek Gubaidullin**

Mathematical modeling of the unit of rectification in the production of phenol and acetone by a combined method

**Darya Sigaeva, Ravil Uzyanbaev, Ilnur Akhmetov**

Mathematical modeling of highly stable oils with high viscosity index

**Ilia Stepanenko, Vadim Pechenin, Nikolay Ruzanov, Alexander Khainovich**

Technique of increasing the accuracy of GTE parts manufactured by selective laser sinterin

**Mikhail Stepanov, Andrew Stepanov, Almira Salikhova**

The means of the GAMMA-3 system for the synthesis and mathematical modelling of the UAV trajectory control systems in the Earth remote sensing problems

**Larisa Stepanova**

Asymptotic methods and their applications in nonlinear fracture mechanics

**Elena Tropkina**

Effective order reduction method based on parametrization of slow invariant manifolds

**Aleksandr Tsarev, Alexander Privalov**

Investigation of the effect of the mobility characteristics of DTN network nodes with the hybrid mobility model

**Vera Turkova, Larisa Stepanova**

Finite element analysis of the biaxial cyclic tensile loading of the elasto-plastic plate with the central hole: asymptotic states

**Pavel Tutubalin, Natalya Arutyunova, Elena Komissarova**

Model of analysis of sustainable management of information security of a distributed information system

**Pavel Tutubalin, Vladimir Mokshin, Elena Komissarova, Natalya Arutyunova**

The approach to concealing data in a distributed system

**Andrey Tyugashev**

On use of Satisfiability modulo theories approach for evaluation of Real-Time spacecraft control logic

**Inessa Useinova**

Stability of equilibria of cancer treatment by chemotherapy model

**Natalya Voropaeva, Olga Vidilina**

The optimal control problem for magnetoelectric actuator

**Mikhail Vovdenko, Salikh Gabitov, Kamila Koledina**

Mathematical modeling of isopropylbenzene oxidation reaction and oxidation reactor

**Changqing Wang, Yuriy Zabolotnov**

Modeling and analysis of the process of forming a vertical tether group of nano-satellites

**Valery Zakharov**

Mathematical modeling of Fiber optic electric field sensor with FBG-based electret

**Valeriy Zasov, Evgeniy Nikonorov**

Stabilization of the solution of the inverse problem of separation of signals on the basis of parameters of the stability path of the solution

**Vladimir Zelenskiy, Artyom Shchodro**

Simulation of oil-gaz separator operation

**Ramil Zhabbarov**

Quasilinearization method for the solution to the problem of plate with central circular hole under creep regime

## Section 4 "Data Science"

(Co-Chairs Vladimir Fursov and Michael Sobolewski)

Section secretary: Yegor Goshin

### Oral Session

<b>Igor Bychkov, Alexander Feoktistov, Ivan Sidorov, Alexei Edelev, Sergey Gorsky and Roman Kostromin</b> <i>Agent learning based on the parameter adjustment of their algorithms for distributed computing management</i>
<b>Alexandr Zhukov, Olga Krasotkina, Valentina Sulimova, Vadim Mottl and Anatoly Markov</b> <i>Featureless rail flows recognition using ultrasonic testing</i>
<b>Dmitry Samoilov, Valentina Semenova and Sergei Smirnov</b> <i>Fractality of the object's properties existence constraints in machine learning</i>
<b>Maria Sapozhnikova, Maya Gayanova, Alexey Vulfin, Andrey Nikonov and Artem Chuykov</b> <i>Processing of big data in the transaction monitoring systems</i>
<b>Labunets Valeriy and Osthaier Ekaterina</b> <i>Cryptosystems based on RS and BCH codes over finite noncommutative algebras</i>
<b>Oleg Shipitko and Anton Grigoryev</b> <i>Gaussian filtering for FPGA based image processing with High-Level Synthesis tools</i>
<b>Ekaterina Orlova</b> <i>Fuzzy model for support investment decisions under risk</i>
<b>Olga Sushkova, Alexei Morozov and Alexandra Gabova</b> <i>An investigation of specificity of features of early stages of Parkinson's disease obtained using the method of cortex electrical activity analysis based on wave trains</i>
<b>Ilnur Akhmetov and Irek Gubaydullin</b> <i>Information-analytical system for modeling chemical-technological processes using parallel computations</i>
<b>Vladimir Mokshin, Ildar Saifudinov, Leonid Sharnin, Mikhail Trusfus and Pavel Tutubalin</b> <i>A parallel genetic algorithm of feature selection for analysis of complex systems</i>
<b>Oksana Mandrikova, Nadezhda Fetisova and Yury Polozov</b> <i>Method for the analysis of ionospheric parameter and the detection of ionospheric anomalies in the tasks of online data processing</i>
<b>Aleksey Filippov, Vadim Moshkin, Anton Zarubin and Albina Koval</b> <i>The applying of syntagmatic patterns for the development of question-answer systems</i>
<b>Marat Enikeev, Marina Maleeva and Leniza Enikeeva</b> <i>Машинное обучение в задаче распознавания питтинговой коррозии на поверхности алюминия</i>
<b>Samal Begenova and Tatiana Avdeenko</b> <i>The research of fuzzy decision trees building based on entropy and the theory of fuzzy sets</i>
<b>Boris Melnikov, Nadezhda Churikova and Mikhail Prus</b> <i>Multi-heuristic and game approaches in search problems of the graph theory</i>
<b>Konstantin Barkalov and Victor Gergel</b> <i>High performance computing for global optimization problems</i>
<b>Nadezhda G. Yarushkina, Vadim Moshkin and Aleksey Filippov</b> <i>Development of an fuzzy knowledge base based on context analysis of problem area</i>

<b>Igor Isaev, Sergey Burikov, Tatiana Dolenko, Kirill Laptinskiy and Sergey Dolenko</b> <i>Improving the resilience of neural network solution of inverse problems in Raman spectroscopy of multi-component solutions of inorganic compounds to the distortions caused by frequency shift of the spectral channels</i>
<b>Svetlana Korabelchshikova, Igor Vasilishin, Dzamal Sultanov and Michail Pugin</b> <i>Using component-wise functions in cryptographical transformation algorithm from Russian National Standard GOST R 34.12-2015</i>
<b>Vladimir Rozaliev, Yulia Orlova, Nikita Nikitin and Aleksey Alekseev</b> <i>Sound generation based on image color spectrum with using the recurrent neural network</i>
<b>Olga Vasilchuk and Kseniia Vasilchuk</b> <i>The Creation of Scalable Tools for Solving Big Data Analysis Problems Based on the MongoDB Database</i>
<b>Данилин Сергей, Щаников Сергей and Ивентьев Александр</b> <i>Detection of a Squitter Signal in Mode S Using a Multilayer Perceptron</i>
<b>Aleksandr Anatolievich Kolpakov and Yuriy Kropotov</b> <i>Development of a model for predicting the performance of a heterogeneous computer system in telecommunications</i>
<b>Ruslan Isaev and Aleksandr Podvesovskii</b> <i>Application of time series analysis for structural and parametric identification of fuzzy cognitive models</i>
<b>Mikhail Osipov and Vladislav Andreev</b> <i>The problem of monitoring of movement in the task of navigation in enclosed spaces</i>
<b>Yury Obukhov and Renata Tolmacheva</b> <i>An Innovative Approach for EEG Phase Coherency Evaluation During Cognitive Tests</i>

### Poster Session

**Iлона Kulikovskikh and Sergej Prokhorov**

A method of implicit regularization based on the phenomena of retrieval-induced forgetting (RIF)

**Lev Antonov, Alexey Orlov and Astafiev Alexander**

Algorithm for detecting the latent mastitis state of animals in a dairy farms on the based of data fusion from different types sensors.

**Nikita Davydov and Alexander Khramov**

Myocardial infarction detection using wavelet analysis of ECG signal

**Irina Khaimovich and Vladimir Ramzaev**

Разработка модели данных для функционирования производственных активных элементов на основе информационного взаимодействия

**Liudmila Yablokova and Dimitriy Golovashkin**

Block algorithm for the joint difference solution of the d'Alembert and Maxwell equations

**Boris Melnikov, Elena Melnikova and Svetlana Pivneva**

Some new heuristic algorithms in analysis of the similarity of DNA-sequences

**Evgeniia Mekhonoshina and Vladimir Modorskii**

Gas flow numerical modeling and structure deformation in operation of the centrifugal compressor stage in nonstationary unbound and bound BFSI formulations

**Yury Obukhov, Konstantin Obukhov and Sergey Nikitov**

Metric Classification of Traumatic Brain Injury Epileptiform Activity from Electroencephalography Data

**Murat Guzairov, Arkadii Frid, Alexey Vulfin and Viktoriya Berkholtz**

Simulation modeling of the system for transmitting telemetric information about the state of on-board airborne systems

**Roman Mishanov**

The application of Kohonen Self-Organizing Maps for the classification of the electronic components and reliability improvement of onboard equipment

**Sergei Vostokin and Irina Kazakova**

Implementation of stream processing using the actor formalism for simulation of distributed insertion sort

**Aleksander Kovartsev and Daria Popova-Kovartseva**

Parallel Algorithm of Morse clusters Global Optimization based on the Strongin method

**Kirill Kuptsov, Yuri Kovalev and Sergey Eremeev**

A research of classification algorithm of spatial information on the basis of methods of persistent homology and random forest

**Александр Юмаганов and Мясников Владислав**

Searching for similar code sequences in executable files based on the structural analysis of functions

**Alexandr Astafiev, Alexey Orlov and Timofey Shardin**

Development of methods and algorithms for multicode labeling data mining for the prediction and prevention of emergency situations during transportation in the movement control systems of industrial products

**Vladislav Klyuev and Aleksandr Kupriyanov**

Implementation and comparison of algorithms for building decision trees for the tasks of object classification

**Alexander Shevchenko**

Fingerprint-vector as a descriptor of the coordination figure

**Victor Tsvetov**

Dual ordered structures of binary relations

**Maria Dorofeeva**

Vector algorithm of FDTD method

**Anastasiia Timofeeva, Tatiana Avdeenko, Ekaterina Makarova and Marina Murtazina**

Combined use of correlation measures in the task of selecting concepts in the construction of ontology



**Olga Sarmanova, Sergey Burikov, Sergey Dolenko, Igor Isaev, Kirill Laptinskiy, Neeraj Prabhakar, Jessica Rosenholm and Tatiana Dolenko**

Monitoring of the excretion of theranostic fluorescent nanocomposites out of the body by artificial neural networks

**Ivakhno Natalya Valerievna, Zikin Sergey Igorevich and Antsibor Sergey Valentinovich**

Method for processing data from the respiratory system in determination of beginning of inspiration/expiration in the apparatus for treating sleep apnoe

**Liliia Butymova and Vladimir Modorskii**

Analysis of 2FSI subsystem LS GTU

**Serdyukov Konstantin and Avdeenko Tatiana**

Method of application the genetic algorithm for automatic generation of test data

**Zaur Shibzukhov**

Minimization of robust sum of loss functions

**Boris Melnikov and Vladislav Dudnikov**

The problem of pseudo-optimal placement of a graph on a plane

**Denis Yablokov**

Using universal data model in materials science for storing crystal-chemical information

**Valeriia Guryanova**

Ensemble of algorithms for coronary heart disease detection based on electrocardiogram

**Igor Anikin**

Information Security Risks Assessment and Management Framework

**Igor Piyakov, Dmitry Rodin, Marina Rodina and Alexey Telegin**

Numerical simulation of the ion focusing process in a dust impact time of flight mass spectrometer

**Alexey Piyakov, Dmitry Rodin, Marina Rodina, Alexey Telegin and Sergey Kondratiev**

Simulation of the control system of the electrodynamic accelerator of dust particles

**Igor Rytsarev, Alexander Blagov and Maximilian Khotilin**

Development and implementation of services to collect social networking data in order to improve the human environment

**Anna Belyakova, Denis Privezencev and Sultan Sadykov**

Algorithms for individual assessment of future changes in heart condition

**Andrey Nikonov, Maya Gayanova, Alexey Vulfin and Maria Sapozhnikova**

Development of the Structure of the Knowledge Base for Neuro-Fuzzy Diagnostic System

**Anton Ivaschenko, Natalya Ilyasova, Anastasia Khorina, Vladislav Isaiko, Daniil Krupin, Viktor Bolotsky and Pavel Sitnikov**

Integration Issues of Big Data Analysis on Social Networks

**Alexander Popov**

Research of classical and distributed approaches to solve the problem of detecting vehicles

**Ekaterina Sharapova and Ruslan Sharapov**

The problem of fuzzy duplicate detection of large texts

**Maksimilian Khotilin, Rustam Paringer and Igor Rytsarev**

Development and analysis of methods for selecting objects in an image

**Olga Gubareva, Oleg Osipov, Vladimir Pugin and Andrey Pocheptsov**

The using of fractal measures to network state monitoring and probabilistic network attack type determination

**Oksana Mandrikova, Timur Zalyaev and Bogdana Mandrikova**

Analysis of the dynamics of cosmic rays on the basis of neural networks

**Pavel Chursin and Danil Polukarov**

The analysis of interconnection in ad-hoc networks

**Mikhail Geras'kin**

Analysis of the influence of citizens' altruism on the effectiveness of the socially optimal actions stimulation system

**Ruth Martinez-Lopez**

Bibliometric trends in High Performance Computing education

**Rostislav Mikherskii, Dmitriy Polyanchuk and Maxim Isaev**

Software implementation of the encryption algorithm based on random numbers with non-uniform distribution

**Sofia Timofeeva, Dmitry Sarkisyan, Nataliya Alzinskaya and Andrei Sukhov**

Development of a network access system in the event of emergency situations of natural and technogenic nature using cluster analysis

**Vladislav Plakhov and Alexander Blagov**

Calculation and forecasting of the financial condition of the university on the basis of data analysis

**Irina Kozlova and Dmitry Sheverev**

The development of a virtual laboratory based on Unreal Engine 4

**Pavel Yakimov**

Augmented Reality System for Surgery Assistance

**Denis Zherdev and Vladimir Procludin**

HPC implementation of radar images modelling method using CUDA

**Maxim Novopashin, Ekaterina Zimina and Александр Шмид**

Cloud technologies in the problems of mathematical analysis of cardiological information

**Vladimir Fursov, Andrey Gavrilov, Yegor Goshin and Kirill Pugachev**

The technology of image matching by the criterion of conformity of image fragments samples

**Igor Rytsarev, Alexander Kupriyanov and Dmitriy Kirsh**  
Clustering of images of social networks using BigData technology

**Kirill Pronchuk and Pavel Yakimov**  
Web service development for road signs recognition based on convolutional neural networks

**Nikolay Artamonov and Pavel Yakimov**  
Applying of the NVIDIA Jetson mobile platform in the classification of traffic signs in a continuous video stream using the YOLO CNN

**Nikita Morunov**  
Implementation of the finite-difference method for solving Maxwell's equations in MATLAB language on a GPU

**Sergei Zaharov, Oksana Zaharova and Boris Lihtsinder**  
Application of probabilistic methods in the implementation of cross-sale of banking products

**Marina Golova, Michael Boyarkin, Konstantin Bychenkov and Artem Nikonorov**  
Recognition an overlap of objects to increase an accuracy of ToF-tracking in augmented reality systems

**Yegor Goshin and Alexandra Kukleva**  
Simultaneous depth map reconstruction and camera parameters estimation from optical flow

**Evgenia Gambarova, Vladislav Bakaev, Nina Olinder, Aleksandr Blagov and Maksim Naumov**  
Analysis of the personal information from social networks to solve the problems of criminology

**Anton Kotov and Vladimir Fursov**  
Computing RPC using robust bucketing for automatic selection of GCPs

**Alexander Shirokanev, Nataly Ilyasova and Rustam Paringer**  
A smart feature selection technique for segmentation of fundus images

**Andrey Armer, Vadim Moshkin and Natalia Krasheninnikova**  
The phonetic composition of the recognized speech recovery using lexical ontology

**Alexandr Astafiev, Alexey Orlov, Dmitry Popov and Maxim Pshenichkin**  
Methods of RFID data processing in intelligent systems for the identification and movement control of industrial products

**Natalia Kravtsova, Rustam Paringer and Alexander Kupriyanov**  
Research of the informative features generation method for for various types of features

**Katalina Grigorova, Elena Malysheva and Kaloyan Mironov**  
Applying process mining techniques and neural networks to creating and assessment of business process models

**Nataliia Limanova and Maksim Sedov**

Method, algorithm and software for fuzzy search in databases

**Anton Kotov, Yegor Goshin and Alexandra Kukleva**

Parallel CUDA implementation of methods for determining external cameras using quaternions

**Marina Murtazina and Avdeenko Tatiana**

The Ontology-driven approach to Support the Requirements Engineering Process in Scrum Framework

**Labunets Valeriy and Osthaier Ekaterina**

Linear codes invariant with respect to generalized shift operators

**Evgeniy Minaev**

Implementation of fractal image compression for mobile platforms

**Konstantin Lovcov, Evgeny Sagatov and Andrei Sukhov**

Secure Routing in the Russian Internet Segment

**Mikhail Osipov and Oleg Chekodaev**

Automation of 3D modeling of urban environment according to attributive information from a digital map

**Alexander Bukatov, Danil Polukarov, Nicolay Zaitsev and Andrei Sukhov**

Searching for ways to improve the quality of VoIP connections

**Viktoria Giorgashvili and Maxim Bakaev**

Methods for Rebuilding Incomplete Data in Online Labor Market Monitoring

**Elvira Fatkhutdinova and Vladimir Fursov**

The technology of correction of dynamic distortions on mobile devices

**Viktoriya Kutikova and Artem Nikonorov**

Deep Learning Ensemble for Social Networks Content Annotation

**Vladimir Fursov, Denis Zherdev and Pavel Hripunov**

Personal data segmentation based on conjugation index usage

**Irina Khaimovich, Vadim Chumak and Vladimir Ramzaev**

Моделирование данных для анализа соответствия городов Поволжского региона формату цифрового государства

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