

Contents

Part I Computer Science

Multimodal Control System of Active Lower Limb Exoskeleton with Feedback	3
S.A. Mineev	
Investigation and Development of Methods for Improving Robustness of Automatic Speech Recognition Algorithms in Complex Acoustic Environments	11
M.L. Korenevsky, Yu.N. Matveev and A.V. Yakovlev	
Smart Endoscope—Firmware Complex for Real-Time Analysis and Recognition of Endoscopic Videos	21
K.U. Erendgenova, E.D. Fedorov, R.M. Kadushnikov, O.A. Kulagina, V.V. Mizgulin, D.I. Starodubov and S.I. Studenok	
The Development of Constructive-Technological Decisions on Creation of a Family of Microelectronic Elements on the «Silicon on Insulator» (SOI) Structures to Provide the Ability to Create Sensors of External Influences of a Various Functional Purpose	31
M.I. Kakoulin, A.V. Leonov, A.A. Malykh, V.N. Mordkovich, A.B. Odnolko and M.I. Pavlyuk	
Thermopile IR Sensor Arrays	39
V.A. Fedirko, E.A. Fetisov, R.Z. Khafizov, G.A. Rudakov and A.A. Sigarev	
Development Signal Processing Integrated Circuit for Position Sensors with High Resolution	49
G.V. Prokofiev, K.N. Bolshakov and V.G. Stakhin	

Brain-Controlled Biometric Signals Employed to Operate External Technical Devices	59
Vasily I. Mironov, Sergey A. Lobov, Innokentiy A. Kastalskiy, Susanna Y. Gordleeva, Alexey S. Pimashkin, Nadezhda P. Krilova, Kseniya V. Volkova, Alexey E. Ossadtchi and Victor B. Kazantsev	
Improving Talent Management with Automated Competence Assessment: Research Summary	73
N.S. Nikitinsky	
Educational Potential of Quantum Cryptography and Its Experimental Modular Realization	83
A.K. Fedorov, A.A. Kanapin, V.L. Kurochkin, Yu.V. Kurochkin, A.V. Losev, A.V. Miller, I.O. Pashinskiy, V.E. Rodimin and A.S. Sokolov	
Interactive Visualization of Non-formalized Data Extracted from News Feeds: Approaches and Perspectives	93
D.A. Kormalev, E.P. Kurshev, A.N. Vinogradov, S.A. Belov and S.V. Paramonov	
Development of Pulsed Solid-State Generators of Millimeter and Submillimeter Wavelengths Based on Multilayer GaAs/AlGaAs Heterostructures	101
V.A. Gergel, N.M. Gorshkova, R.A. Khabibullin, P.P. Maltsev, V.S. Minkin, S.A. Nikitov, A.Yu. Pavlov, V.V. Pavlovskiy and A.A. Trofimov	
Asymmetric Magnetoimpedance in Bimagnetic Multilayered Film Structures	107
A.S. Antonov and N.A. Buznikov	
The Model of the Cybernetic Network and Its Realization on the Cluster of Universal and Graphic Processors	117
A.E. Krasnov, A.A. Kalachev, E.N. Nadezhdin, D.N. Nikolskii and D.S. Repin	
Autonomous Mobile Robotic System for Coastal Monitoring and Forecasting Marine Natural Disasters	129
V.V. Belyakov, P.O. Beresnev, D.V. Zeziulin, A.A. Kurkin, O.E. Kurkina, V.D. Kuzin, V.S. Makarov, P.P. Pronin, D.Yu. Tyugin and V.I. Filatov	
On Creation of Highly Efficient Micro-Hydraulic Power Plants of Pontoon Modular Design in Conditions of Super-Low Flow Parameters.	137
A.V. Volkov, A.A. Vikhlyantsev, A.A. Druzhinin, A.G. Parygin and A.V. Ryzhenkov	

Development of Scientific and Technical Solutions to Create Hybrid Power Source Based on Solid Oxide Fuel Cells and Power Storage System for Responsible Consumers.	149
A.I. Chivenkov, E.V. Kryukov, A.B. Loskutov and E.N. Sosnina	
Automated Control Unit of Power Flow in Intellectual Electricity Distribution Network	159
M.G. Astashev, D.I. Panfilov, P.A. Rashitov, A.N. Rozhkov and D.A. Seregin	
The Partial Replacement of Diesel Fuel in Hot Water Boiler with Syngas Obtained by Thermal Conversion of Wood Waste	165
O.M. Larina, V.A. Lavrenov and V.M. Zaitchenko	
The Experimental Research on Independent Starting and Autonomous Operation of HDTB Considered as a Basic Block of AES Based on Supercritical Hydrothermal Destruction	171
A.D. Vedenin, V.S. Grigoryev, Ya.P. Lobatchevskiy, A.I. Nikolaev, G.S. Savelyev and A.V. Strelets	
Development of a Multifunctional All-Terrain Vehicle Equipped with Intelligent Wheel-Drive System for Providing Increased Level of Energy Efficiency and Improved Fuel Economy	179
V.V. Belyakov, P.O. Beresnev, D.V. Zeziulin, A.A. Kurkin, V.S. Makarov and V.I. Filatov	
Development and Implementation of an Integrated Approach to Improving the Operating Cycle and Design of an Energy-Efficient Forced Diesel Engine.	189
K.V. Gavrilov, V.G. Kamaltdinov, N.A. Khozeniuk, E.A. Lazarev and Y.V. Rozhdestvensky	
The Development of the New Type Universal Collective Survival Craft with Unmanned Control Function for Evacuation of Personnel in Emergency Situations of Natural and Technogenic Character on the Arctic Shelf	199
I.A. Vasilyev, R.A. Dorofeev, J.V. Korushova, A.A. Koshurina and M.S. Krashenninnikov	
Development of Active Safety Software of Road Freight Transport, Aimed at Improving Inter-City Road Safety, Based on Stereo Vision Technologies and Road Scene Analysis.	209
V.E. Prun, V.V. Postnikov, R.N. Sadekov and D.L. Sholomov	
Analysis of the Stress State in Steel Components Using Portable X-Ray Diffraction.	219
S.A. Nikulin, S.L. Shitkin, A.B. Rozhnov, S.O. Rogachev and T.A. Nechaykina	

The VLSI High-Level Synthesis for Building Onboard Spacecraft Control Systems	229
O.V. Nepomnyashchiy, I.V. Ryjenko, V.V. Shaydurov, N.Y. Sirotnina and A.I. Postnikov	
A Concept of Robotic System with Force-Controlled Manipulators for On-Orbit Servicing Spacecraft	239
I. Dalyaev, V. Titov and I. Shardyko	
Development of Microlinear Piezo-Drives for Spacecraft Actuators	247
A.V. Azin, S.V. Rikonen, S.V. Ponomarev and A.M. Khramtsov	
Design of Dynamic Scale Model of Long Endurance Unmanned Aerial Vehicle	255
V.S. Fedotov, A.V. Gomzin and I.I. Salavatov	
Features of the Development of Regional Transport Models	263
P.V. Loginov, A.N. Zatsepin and V.A. Pavlov	
Part II NanoScience and NanoTechnology	
The Influence of AlGa_N Barrier-Layer Thickness on the GaN HEMT Parameters for Space Applications	273
A.G. Gudkov, V.D. Shashurin, V.N. Vyuginov, V.G. Tikhomirov, S.I. Vidyakin, S.V. Agasieva, E.N. Gorlacheva and S.V. Chizhikov	
Application of Volume-Surface Hardening by High-Speed Water Flow for Improving Static and Cyclic Strength of Large-Scale Castings from Low-Carbon Steel	281
S.A. Nikulin, A.B. Rozhnov, T.A. Nechaykina, V.I. Anikeenko, V.Yu. Turilina and S.O. Rogachev	
Thermotropic Gel-Forming and Sol-Forming Systems for Enhanced Oil Recovery and Technologies of Their Joint Application with Thermal Methods for Oil Production	287
L.K. Altunina and V.A. Kuvshinov	
The Mixture of Fatty Acids Conversion into Hydrocarbons Over Original Pt-Sn/Al₂O₃ Catalyst	297
A.E. Gekhman, A.V. Chistyakov, M.V. Tsodikov, P.A. Zharova, S.S. Shapovalov and A.A. Pasynskii	
Beneficiation of Heat-Treated Crushed Brown Coal for Energy Production and Utilities	305
V.A. Moiseev, V.G. Andrienko, V.G. Piletskii, V.A. Donchenko and A.I. Urvantsev	

NiMo/USY-Alumina Catalysts with Different Zeolite Content for Vacuum Gas Oil Hydrocracking Over Stacked Beds	319
P.P. Dik, V.P. Doronin, E.Yu. Gerasimov, M.O. Kazakov, O.V. Klimov, G.I. Koryakina, K.A. Nadeina, A.S. Noskov and T.P. Sorokina	
Comparative Mechanical Tests of Samples Obtained by the Domestic Experimental Unit Meltmaster^{3D}-550	329
A.V. Dub, V.V. Beregovsky, E.V. Tretyakov, S.A. Schurenkova and A.V. Yudin	
Development of Lithium-Ion Battery of the “Doped Lithium Iron Phosphate–Doped Lithium Titanate” System for Power Applications	341
A.A. Chekannikov, A.A. Kuz'mina, T.L. Kulova, S.A. Novikova, A.M. Skundin, I.A. Stenina and A.B. Yaroslavl'tsev	
Advanced Heat-Resistant TiAl (Nb,Cr,Zr)-Based Intermetallics with the Stabilized β(Ti)-Phase	351
A.V. Kartavykh, M.V. Gorshenkov and A.V. Korotitskiy	
Structural and Magnetic Properties of As-Cast Fe–Nd Alloys	363
V.P. Menushenkov, I.V. Shchetinin, M.V. Gorshenkov and A.G. Savchenko	
Laser Technology of Designing Nanocomposite Implants of the Knee Ligaments	373
A.Yu. Gerasimenko, U.E. Kurilova, M.V. Mezentseva, S.A. Oshkukov, V.M. Podgaetskii, I.A. Suetina, V.V. Zar and N.N. Zhurbina	
Properties of Structural Steels with Nanoscale Substructure	385
T.V. Lomaeva, L.L. Lukin, L.N. Maslov, O.I. Shavrin and A.N. Skvortsov	
Near-Net Shapes Al_2O_3–SiC_w Ceramic Nanocomposites Produced by Hybrid Spark Plasma Sintering	397
E. Kuznetsova, P. Peretyagin, A. Smirnov, W. Solis and R. Torrecillas	
Development of Technical and Technological Solutions in the Field of Multilayer Graphene for Creating Electrode Nanomaterial Energy Storage Devices	405
N.R. Memetov, A.V. Schegolkov, G.V. Solomakho and A.G. Tkachev	
Carbon Fiber-Reinforced Polyurethane Composites with Modified Carbon–Polymer Interface	415
A.R. Karaeva, N.V. Kazennov, V.Z. Mordkovich, S.A. Urvanov and E.A. Zhukova	

Development and Research of Multifrequency X-ray Tube with a Field Nanocathode	421
T.A. Gryazneva, G.D. Demin, M.A. Makhiboroda, N.A. Djuzhev and V.E. Skvorcov	
Quasicrystalline Powders as the Fillers for Polymer-Based Composites: Production, Introduction to Polymer Matrix, Properties	429
A.A. Stepashkin, D.I. Chukov, L.K. Olifirov, A.I. Salimon and V.V. Tcherdyntsev	
Selection of Aluminum Matrix for Boron–Aluminum Sheet Alloys	439
N.A. Belov, K.Yu. Chervyakova and M.E. Samoshina	
Features of Carbide Precipitation During Tempering of 15H2NMFA and 26HN3M2FA Steels	449
S.V. Belikov, V.A. Dub, P.A. Kozlov, A.A. Popov, A.O. Rodin, A.Yu. Churyumov and I.A. Shepkin	
Improvement of the Mechanical and Biomedical Properties of Implants via the Production of Nanocomposite Based on Nanostructured Titanium Matrix and Bioactive Nanocoating	461
E.G. Zemtsova, A.Yu. Arbenin, R.Z. Valiev and V.M. Smirnov	
Nanopowders Synthesis of Oxygen-Free Titanium Compounds—Nitride, Carbonitride, and Carbide in a Plasma Reactor	469
N.V. Alexeev, D.E. Kirpichev, A.V. Samokhin, M.A. Sinayskiy and Yu.V. Tsvetkov	
The Technology and Setup for High-Throughput Synthesis of Endohedral Metal Fullerenes	481
D.I. Chervyakova, G.N. Churilov, A.I. Dudnik, G.A. Glushenko, E.A. Kovaleva, A.A. Kuzubov, N.S. Nikolaev, I.V. Osipova and N.G. Vnukova	
On Some Features of Nanostructural Modification of Polymer-Inorganic Composite Materials for Light Industry and for Building Industry	491
M.V. Akulova, S.A. Koksharov, O.V. Meteleva and S.V. Fedosov	
High-Speed Laser Direct Deposition Technology: Theoretical Aspects, Experimental Researches, Analysis of Structure, and Properties of Metallic Products	501
K.D. Babkin, V.V. Cheverikin, O.G. Klimova-Korsmik, M.O. Sklyar, S.L. Stankevich, G.A. Turichin, A.Ya. Travyanov, E.A. Valdaytseva and E.V. Zemlyakov	

Synthesis and Properties of Energetics Metal Borides for Hybrid Solid-Propellant Rocket Engines	511
S.S. Bondarchuk, A.E. Matveev, V.V. Promakhov, A.B. Vorozhtsov, A.S. Zhukov, I.A. Zhukov and M.H. Ziatdinov	
Mechanical Treatment of ZrB₂-SiC Powders and Sintered Ceramic Composites Properties	521
S.P. Buyakova, A.G. Knyazeva, A.G. Burlachenko, Yu. Mirovoi and S.N. Kulkov	
Part III Health and Ecology and Environment Sciences	
The Influence of DCs Loaded with Tumor Antigens on the Cytotoxic Response of MNC Culture Patients with Oncology	533
A.P. Cherkasov, J.N. Khantakova, S.A. Falaleeva, A.A. Khristin, N.A. Kiryishina, V.V. Kozlov, E.V. Kulikova, V.V. Kurilin, J.A. Lopatnikova, I.A. Obleukhova, S.V. Sennikov, J.A. Shevchenko, S.V. Sidorov, A.V. Sokolov and A.E. Vitsin	
Establishment of a Technological Platform for Pre-Clinical Evaluation of Biomedical Cellular Products in Russia	543
P.I. Makarevich, Yu P. Rubtsov, D.V. Stambolsky, N.I. Kalinina, Zh A. Akopyan, Y.V. Parfyonova and V.A. Tkachuk	
Combination of Functional Electrical Stimulation and Noninvasive Spinal Cord Electrical Stimulation for Movement Rehabilitation of the Children with Cerebral Palsy	551
A.G. Baidurashvili, G.A. Ikoeva, Y.P. Gerasimenko, T.R. Moshonkina, I.E. Nikityuk, I.A. Solopova, I.A. Sukhotina, S.V. Vissarionov and D.S. Zhvansky	
Bifunctional Recombinant Protein Agent Based on Pseudomonas Exotoxin A Fragment for Targeted Therapy of HER2-Positive Tumors	563
S.M. Deyev, O.M. Kutova, E.N. Lebedenko, G.M. Proshkina, A.A. Schulga and E.A. Sokolova	
Development of Classification Rules for a Screening Diagnostics of Lung Cancer Patients Based on the Spectral Analysis of Metabolic Profiles in the Exhaled Air	573
A.V. Borisov, Yu.V. Kistenev, D.A. Kuzmin, V.V. Nikolaev, A.V. Shapovalov and D.A. Vrazhnov	
Antitumor Effect of Vaccinia Virus Double Recombinant Strains Expressing Genes of Cytokine GM-CSF and Oncotoxic Peptide Lactaptin	581
G.V. Kochneva, O.A. Koval, E.V. Kuligina, A.V. Tkacheva and V.A. Richter	

Genome-Wide Association Studies for Milk Production Traits in Russian Population of Holstein and Black-and-White Cattle	591
A.A. Sergyagin, E.A. Gladyr, K.V. Plemiyashov, A.A. Kudinov, A.V. Dotsev, T.E. Deniskova and N.A. Zinovieva	
Overview of 17,856 Compound Screening for Translation Inhibition and DNA Damage in Bacteria	601
P.V. Sergiev, E.S. Komarova (Andreianova), I.A. Osterman, Ph.I. Pletnev, A.Ya. Golovina, I.G. Laptev, S.A. Evfratov, E.I. Marusich, M.S. Veselov, S.V. Leonov, Ya.A. Ivanenkov, A.A. Bogdanov and O.A. Dontsova	
Shape of the Voltage–Frequency Curve Depending on the Type of the Object Detached from the QCM Surface	609
F.N. Dultsev	
Complex Technology of Oil Sludge Processing	617
A.V. Anisimov, V.I. Frolov, E.V. Ivanov, E.A. Karakhanov, S.V. Lesin and V.A. Vinokurov	
Comprehensive Ground-Space Monitoring of Anthropogenic Impact on Russian Black Sea Coastal Water Areas	625
V.G. Bondur and V.V. Zamshin	
Determination of the Optimal Technological Conditions of Processing of the Alkali Alumosilicate	639
V.N. Brichkin, A.M. Gumenyuk, A.V. Panov and A.G. Suss	
New Highly Efficient Dry Separation Technologies of Fine Materials	649
V.A. Arsentyev, A.M. Gerasimov, S.V. Dmitriev and A.O. Mezenin	
Hydrogenation Processing of Heavy Oil Wastes in the Presence of Highly Efficient Ultrafine Catalysts	659
A.E. Batov, Kh.M. Kadiev, M.Kh. Kadieva, A.L. Maximov and N.V. Oknina	
Development of Unified Import-Substituting Energy-Saving Technology for Purification of Roily Oils, Oil-Slimes, and Chemical and Petrochemical Effluents	669
V.V. Grigorov and G.V. Grigoriev	
Development of Remote and Contact Techniques for Monitoring the Atmospheric Composition, Structure, and Dynamics	679
B.D. Belan, Yu.S. Balin, V.A. Banakh, V.V. Belov, V.S. Kozlov, A.V. Nevzorov, S.L. Odintsov, M.V. Panchenko and O.A. Romanovskii	

Technology of Integrated Impact on the Low-Permeable Reservoirs of Bazhenov Formation	693
V.S. Verbitskiy, V.V. Grachev and A.D. Dmitrievskiy	
Development of the First Russian Anammox-Based Technology for Nitrogen Removal from Wastewater	699
A.M. Agarev, A.G. Dorofeev, A.Yu. Kallistova, M.V. Kevbrina, M.N. Kozlov, Yu.A. Nikolaev and N.V. Pimenov	
Pulse-Detonation Hydrojet	709
S.M. Frolov, K.A. Avdeev, V.S. Aksenov, F.S. Frolov, I.A. Sadykov, I.O. Shamshin and R.R. Tukhvatullina	
Development of Technological Process of Matrix Conversion of Natural and Associated Petroleum Gases into Syngas with Low Content of Nitrogen	721
V.S. Arutyunov, A.V. Nikitin, V.I. Savchenko, I.V. Sedov, O.V. Shapovalova and V.M. Shmelev	

Proceedings of the Scientific-Practical Conference

"Research and Development - 2016"

Anisimov, K.V.; Dub, A.V.; Kolpakov, S.K.; Lisitsa, A.V.;

Petrov, A.N.; Polukarov, V.P.; Popel, O.S.; Vinokurov,

V.A. (Eds.)

2018, XVII, 730 p. 311 illus., 187 illus. in color.,

Hardcover

ISBN: 978-3-319-62869-1