

# **3rd International Conference on Dynamics and Vibroacoustics of Machines (DVM2016)**

Procedia Engineering Volume 176

Samara, Russia  
29 June – 1 July 2016

**Editors:**

**Viktor Sverbilov  
Andrew Plummer**

ISBN: 978-1-5108-3730-0

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© by Elsevier B.V.  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Elsevier B.V.  
at the address below.

Elsevier B.V.  
Radarweg 29  
Amsterdam 1043 NX  
The Netherlands

Phone: +31 20 485 3911  
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

**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  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>PREFACE</b> .....	1
<i>N/A</i>	
<b>SIMULATION OF CONTACTLESS FIBER-OPTIC SYSTEM FOR VALVE STATUS MONITORING</b> .....	2
<i>Orkhan G. Babaev, Sergey A. Matyunin, Maxim V. Stepanov</i>	
<b>STUDY OF LOADING IN POINT-INVOLUTE GEARS</b> .....	12
<i>Aleksey Suslin, Clovis Pilla</i>	
<b>BALL BEARING DYNAMICS AT THE INTERFERENCE FIT ON BALLS</b> .....	19
<i>I. S. Barmanov, M. N. Ortikov</i>	
<b>INVESTIGATION OF THE DYNAMICS OF GEAR SYSTEMS WITH CONSIDERATION OF A PINION SUPPORT FLEXIBILITY</b> .....	25
<i>Mikhail Kurushin, Valeriy Balyakin, Venceslas Ossiala</i>	
<b>THE USE OF VECTOR MODELS TO STUDY THE DYNAMIC CHARACTERISTICS OF AN ADVANCED TWO-SHAFT INTERNAL COMBUSTION ENGINE</b> .....	37
<i>Boris B. Kosenok, Valeriy B. Balyakin, Igor N. Giltsov</i>	
<b>DYNAMIC OF DAMAGE OF AIRCRAFT ENGINE HIGH-SPEED ROLLING-ELEMENT BEARINGS TESTED IN LOW-VISCOSITY MODEL MEDIUMS</b> .....	43
<i>B. M. Silaev, D. G. Fedorov, P. A. Danilenko</i>	
<b>THREE-DIMENSIONAL MODELING OF DEEP HOLE VIBRATORY DRILLING DYNAMICS</b> .....	50
<i>I. A. Kiselev, N. A. Zhukov, A. N. Selivanov, D. V. Barysheva, S. A. Voronov, A. M. Gouskov</i>	
<b>THE PROCEDURE FOR SUBSPACE IDENTIFICATION OPTIMAL PARAMETERS SELECTION IN APPLICATION TO THE TURBINE BLADE MODAL ANALYSIS</b> .....	56
<i>V. A. Kuts, S. M. Nikolaev, S. A. Voronov</i>	
<b>ANALYSIS OF FLEXIBLE METAL HOSES FREQUENCY CHARACTERISTICS</b> .....	66
<i>A. N. Murzin, A. I. Belousov</i>	
<b>RESEARCH OF THE INFLUENCE OF SEVERAL CONSTANTS OF THE QUADRATIC TURBULENCE MODEL ON THE RESULTS OF PULSATED SEPARATED FLOW SIMULATION</b> .....	71
<i>Alexey V. Boldyrev, Sergey V. Boldyrev, Sergey I. Kharchuk</i>	
<b>SIMULATION OF DIRECT DRIVE ELECTROMECHANICAL ACTUATOR WITH BALLSCREW</b> .....	85
<i>L. Bilyaletdinova, A. Steblinkin</i>	
<b>EFFECT OF THE METHOD FOR TREATMENT OF THE FUNCTIONAL SURFACE OF A PIEZOELECTRIC VIBRATION SENSOR ON ITS SENSITIVITY</b> .....	96
<i>Y. S. Andreev, N. A. Demkovich, R. M. Isaev, A. A. Tselishev, S. D. Vasilkov</i>	
<b>ANALYTICAL CALCULATION OF HYDRAULIC CHARACTERISTICS OF JET-CAVITATION FLUID MASS FLOW STABILIZERS</b> .....	107
<i>Sergey Y. Konstantinov, Vladimir A. Tselishev, Dmitriy V. Tselishev</i>	
<b>THE APPLICATION OF PASSIVE VIBROPROTECTIVE SYSTEMS HAVING POWER CHARACTERISTICS WITH HYSTERESIS LOOPS OF RECTANGULAR SHAPE FOR THE MAIN PUMPING UNITS</b> .....	118
<i>Artem Tokarev, Alexey Zotov, Anvar Valeev</i>	
<b>RESEARCH ON CHARACTERISTICS OF FIBER OPTIC SENSORS FOR ANTHROPOMORPHOUS ROBOTS</b> .....	128
<i>Sergey A. Matyunin</i>	
<b>STUDY OF APPLICATION OF VIBRATION ISOLATORS WITH QUASI-ZERO STIFFNESS FOR REDUCING DYNAMICS LOADS ON THE FOUNDATION</b> .....	137
<i>Valeev Anvar, Zotov Alexey, Tokarev Artem</i>	
<b>THE MONITORING SYSTEM OF AN ACTUAL TECHNICAL CONDITION FOR PUMPING UNITS WITH FREQUENCY ANALYSIS</b> .....	144
<i>Saubanov Oscar, Valeev Anvar</i>	
<b>ON DIFFERENT ENGINEERING IDEAS OF ECO-DESIGNER RESOURCE-SAVING STUDIES OF EFFECTIVE SOUND-ABSORBING SUBSTANCES AND NOISE-REDUCING CONSTRUCTIONS</b> .....	150
<i>Michael I. Fesina, Alexander V. Krasnov, Larisa N. Gorina</i>	

<b>THE EFFECTIVENESS OF THE SUPPRESSION OF LOW FREQUENCY ACOUSTIC RESONANCES WITH POROUS SOUND ABSORBING STRUCTURES OF MULTIFUNCTIONAL UPHOLSTERY MATERIALS OF CAR BODY INTERIOR .....</b>	<b>159</b>
<i>Michael I. Fesina, Alexander V. Krasnov, Larisa N. Gorina</i>	
<b>CALCULATION OF VIBRATION OF PIPELINE BUNDLE WITH DAMPING SUPPORT MADE OF MR MATERIAL .....</b>	<b>169</b>
<i>S. A. Bezborodov, A. M. Ulanov</i>	
<b>COMPARISON OF DIFFERENT METHODS OF NON-CONTACT VIBRATION MEASUREMENT .....</b>	<b>175</b>
<i>D. S. Lezhin, S. V. Falaleev, A. I. Safin, A. M. Ulanov, D. Vergnano</i>	
<b>DETECTION OF VIBRODIAGNOSTIC SIGNS OF WORKING BODY ACOUSTIC VIBRATIONS IN GPA-16R “UFA” GAS CHANNEL .....</b>	<b>184</b>
<i>I. A. Krivosheev, V. I. Akimov, D. G. Kozhinov</i>	
<b>STEADY AND TRANSIENT MATHEMATICAL MODELS OF STEAM JETS .....</b>	<b>194</b>
<i>V. B. Tupov, A. A. Taratorin</i>	
<b>THE CHOICE OF TURBULENCE MODELS FOR STEAM JETS.....</b>	<b>199</b>
<i>V. B. Tupov, A. A. Taratorin</i>	
<b>SIMULATION OF GAS TURBINE ENGINES CONSIDERING THE ROTATING STALL IN A COMPRESSOR .....</b>	<b>207</b>
<i>A. E. Mikhailov, A. B. Mikhailova, Yu. M. Akhmetov, D. A. Akhmedzyanov</i>	
<b>NOISE CALCULATION METHOD FOR INDUSTRIAL PREMISES WITH BULKY EQUIPMENT AT MIRROR-DIFFUSE SOUND REFLECTION .....</b>	<b>218</b>
<i>I. Tsukernikov, A. Antonov, V. Ledenev, I. Shubin, T. Nevenchannaya</i>	
<b>ROD RESONANT OSCILLATIONS CONSIDERING MATERIAL RELAXATION PROPERTIES .....</b>	<b>226</b>
<i>V. A. Kudinov, A. V. Eremin, I. V. Kudinov, A. I. Dovgallo</i>	
<b>GAS RESONANT OSCILLATIONS CONSIDERING GAS RELAXATION PROPERTIES .....</b>	<b>237</b>
<i>V. A. Kudinov, S. O. Nekrasova, A. V. Eremin, I. V. Kudinov</i>	
<b>METHOD OF CONTROLLING CUTTING TOOL WEAR BASED ON SIGNAL ANALYSIS OF ACOUSTIC EMISSION FOR MILLING .....</b>	<b>246</b>
<i>Vadim A. Pechenin, Alexander I. Khaimovich, Aleksandr I. Kondratiev, Michael A. Bolotov</i>	
<b>MATHEMATICAL MODEL OF “WORKING GAP – PAD – ELASTIC SUPPORT” SYSTEM FOR ROTOR SUPPORT TILTING-PAD JOURNAL BEARING .....</b>	<b>253</b>
<i>E. F. Parovay, S. V. Falaleev</i>	
<b>DESIGN AND QUALIFICATION OF AN ANECHOIC FACILITY IN PNRPU.....</b>	<b>264</b>
<i>V. F. Kopiev, V. V. Palchikovskiy, Yu. V. Bersenev, S. Yu. Makashov, I. V. Belyaev, I. A. Korin, E. V. Sorokin, I. V. Khramtsov, O. Yu. Kustov</i>	
<b>AZIMUTHAL MODES MEASUREMENT IN AN INTAKE DUCT FOR A TURBOFAN ENGINE .....</b>	<b>273</b>
<i>V. F. Kopiev, Yu. V. Bersenev, T. A. Viskova, R. V. Burdakov, V. V. Palchikovskiy, I. V. Belyaev, O. Yu. Kustov, V. Ershov</i>	
<b>CALCULATION-EXPERIMENTAL METHOD OF DETERMINING THE PROPENSITY FOR WARPING NON-RIGID DISKS OF HYDRAULIC MACHINE .....</b>	<b>278</b>
<i>G. A. Nesterenko, I. S. Nesterenko</i>	
<b>IMPROVING OF ACOUSTIC EMISSION SIGNAL DETECTION FOR FATIGUE FRACTURE MONITORING.....</b>	<b>284</b>
<i>A. Danyuk, I. Rastegaev, E. Pomponi, M. Linderov, D. Merson, A. Vinogradov</i>	
<b>ANALYSIS OF ACOUSTIC OSCILLATIONS DEPENDENCE ON THE PROCESS PARAMETERS IN LASER TREATMENT .....</b>	<b>291</b>
<i>Veliev David, Israphilov Irek, Zvezdin Valery</i>	
<b>THE INVESTIGATION OF THE WORK-FLUID CHARACTERISTICS OF PRECISION HYDRAULIC ACTIVE VIBRATION CONTROL MODULE.....</b>	<b>296</b>
<i>Alexey M. Bazinenkov, Maria S. Mosina, Valery P. Mikhailov</i>	
<b>INVESTIGATION OF TRIBOLOGICAL PROPERTIES OF METALLIC MATERIALS WITH THE USE OF THE UNIVERSAL FRICTION MACHINE “MTU-1” .....</b>	<b>301</b>
<i>S. Perepelkina, P. Kovalenko, R. Pechenko</i>	
<b>CONSTRUCTION DIAGNOSTICS OF THE AIRCRAFT PARTS ON THE BASIS OF THE ENERGY METHOD AND THE STRESS-STATE STIFFNESS CRITERION .....</b>	<b>310</b>
<i>A. S. Bukatyi, S. A. Bukatyi, A. A. Okrugin</i>	
<b>NON-LINEAR VIBRATION PROTECTION SYSTEMS PHASE-FREQUENCY CHARACTERISTICS MEASUREMENT METHOD AND ITS RESEARCH FOR POLYHARMONIC MODEL OF VIBRATION SIGNAL.....</b>	<b>319</b>
<i>L.A. Varzhitskii, G. V. Lazutkin, D. P. Davydov, O. S. Surkov, K. V. Boyarov</i>	

<b>DESIGN OF ELASTIC-DAMPING SUPPORTS MADE OF MR MATERIAL FOR PIPELINE SUPPORTS .....</b>	<b>326</b>
<i>G. V. Lazutkin, K. V. Boyarov, D. P. Davydov, T. V. Volkova, L.A. Varzhitskii</i>	
<b>NON-LINEAR OSCILLATIONS OF MECHANICAL SYSTEMS WITH STRUCTURE DAMPING VIBRATION PROTECTION DEVICES .....</b>	<b>334</b>
<i>G. V. Lazutkin, D. P. Davydov, L. A. Varzhitskiy, K. V. Boyarov, T. V. Volkova</i>	
<b>ADVANCED DYNAMIC MODEL DEVELOPMENT OF DRY GAS SEAL.....</b>	<b>344</b>
<i>Renat R. Badykov, Sergey V. Falaleev</i>	
<b>EVOLUTION OF THE RESIDUAL STRESSES FORMATION FROM FEC0.15CR12NI2 STEEL IN THE PART SURFACE DURING THE DIAMOND SMOOTHING .....</b>	<b>355</b>
<i>A. N. Shvetcov, D. L. Skuratov</i>	
<b>NUMERICAL ESTIMATION OF PRECISION EQUIPMENT VIBRATION ISOLATION SYSTEM .....</b>	<b>363</b>
<i>Smirnov Vladimir</i>	
<b>TO THE QUESTION OF VIBRATION LEVELS PREDICTION INSIDE RESIDENTIAL BUILDINGS CAUSED BY UNDERGROUND TRAFFIC.....</b>	<b>371</b>
<i>Smirnov Vladimir, Tsukernikov Ilya</i>	
<b>INFLUENCE AN ADDITIONAL INCLUSION ON DYNAMIC PERFORMANCE OF MACHINE .....</b>	<b>381</b>
<i>V. Seregin Sergei, V. Kosmynin Alexander</i>	
<b>MODELING OF VIBROIMPACT PROCESSES WHICH OCCURS IN FEET CHANGING OF THE WALKING UNITS AT VISCOELASTIC GROUNDS .....</b>	<b>387</b>
<i>V. V. Chernyshev, A. A. Goncharov, V. V. Arykantsev</i>	
<b>THE CALCULATED ESTIMATE OF PRESSURE OSCILLATIONS BEHIND THE POWER PLANT COMBUSTION CHAMBER BURNER.....</b>	<b>394</b>
<i>M. Y. Orlov, I. A. Zubrilin, R. A. Zubrilin</i>	
<b>APPLICATION OF NEURAL NETWORK TECHNOLOGY AND HIGH-PERFORMANCE COMPUTING FOR IDENTIFICATION AND REAL-TIME HARDWARE-IN-THE-LOOP SIMULATION OF GAS TURBINE ENGINES.....</b>	<b>402</b>
<i>G. I. Pogorelov, G. G. Kulikov, A. I. Abdulnagimov, B. I. Badamshin</i>	
<b>IDENTIFICATION METHOD FOR NONLINEAR DYNAMIC MODELS OF GAS TURBINE ENGINES ON ACCELERATION MODE.....</b>	<b>409</b>
<i>O. D. Lyantsev, A. V. Kazantsev, A. I. Abdulnagimov</i>	
<b>CHARACTERISTIC TIMES OF ACOUSTIC AND CONDENSATION INSTABILITY IN HEAT-RELEASING GAS MEDIA .....</b>	<b>416</b>
<i>D. S. Ryashchikov, N. E. Molevich, D. I. Zavershinskii</i>	
<b>EXPERIMENTAL RESEARCH OF THE LIFE TIME OF THE CABLE VIBRATION DAMPERS .....</b>	<b>423</b>
<i>Igor K. Mikhalkin, Yury K. Ponomarev, Oleg. B. Simakov</i>	
<b>EXPERIMENTAL RESEARCH OF ULTRA SMALL VIBRATION DAMPERS FOR PROTECTION AGAINST VIBRATION OF MEMORY UNITS IN AUTOMATIC ON-BOARD SYSTEMS ON VEHICLES .....</b>	<b>429</b>
<i>Oleg B. Simakov, Igor K. Mikhalkin, Yury K. Ponomarev</i>	
<b>THE ENHANCED SPLINE-METHOD FOR NUMERICAL RESULTS OF NATURAL FREQUENCIES OF BEAMS.....</b>	<b>438</b>
<i>V. S. Zhernakov, V. P. Pavlov, V. M. Kudoyarova</i>	
<b>FLUCTUATIONS IN THE PROCESS PLANT AS A QUALITY ASSESSMENT CRITERION OF LOW-TEMPERATURE PLASMA HARDENING PROCESS.....</b>	<b>451</b>
<i>V. Martynov, B. Brzhozovsky, E. Zimina, I. Yankin, A. Susskiy</i>	
<b>THE MODEL AND THE METHODS FOR NUMERICAL SIMULATION OF WAVE ACTION OF REAL WORKING FLUIDS IN PIPELINES.....</b>	<b>461</b>
<i>R. D. Enikeev, G. A. Nozdrin, A. A. Chernousov</i>	
<b>SPECKLE-INTERFEROMETRY IN THE INVESTIGATION OF LARGE-SIZE GAS TURBINE ENGINE STRUCTURES VIBRATION.....</b>	<b>471</b>
<i>N. D. Bystrov, A. I. Zhuzhukin</i>	
<b>MULTI-CRITERIA OPTIMIZATION OF THE FLOW OF A CENTRIFUGAL PUMP ON ENERGY AND VIBROACOUSTIC CHARACTERISTICS .....</b>	<b>476</b>
<i>V. O. Lomakin, P. S. Chaburko, M. S. Kuleshova</i>	
<b>STUDYING OF MANUFACTURING TOLERANCE INFLUENCE ON THE PERFORMANCE OF GTE ROTOR ELASTIC RINGS .....</b>	<b>483</b>
<i>D. S. Diligenskiy, D. K. Novikov</i>	
<b>THE MODELING OF INVERSE KINEMATICS FOR 5 DOF MANIPULATOR .....</b>	<b>498</b>
<i>V. N. Iliukhin, K. B. Mitkovskii, D. A. Bizyanova, A. A. Akopyan</i>	

<b>THE DEVELOPMENT OF MOTION CAPTURE SYSTEM BASED ON KINECT SENSOR AND BLUETOOTH-GLOVES</b> .....	506
<i>V. N. Iliukhin, K. B. Mitkovskii, D. A. Bizyanova, A. A. Akopyan</i>	
<b>ACTIVE VIBRATION DAMPING IN HYDRAULIC CONSTRUCTION MACHINERY</b> .....	514
<i>Addison Alexander, Andrea Vacca, Davide Cristofori</i>	
<b>THE METHOD OF IMPROVING THE ACCURACY OF MECHATRONIC SYSTEMS FOR COMPLEX GEOMETRY MEASUREMENTS</b> .....	529
<i>Nikolay V. Ruzanov, Michael A. Bolotov, Vadim A. Pechenin, Nikolay D. Pronichev, Ekaterina R. Stepanova</i>	
<b>IMPLEMENTATION OF THE ADDITIVE TECHNOLOGY TO THE DESIGN AND MANUFACTURING OF VIBROISOLATORS WITH REQUIRED FILTERING</b> .....	540
<i>V. G. Smelov, A. V. Sotov, A. V. Agapovichev, M. M. Laktionova, T. M. Tomilina</i>	
<b>FORMATION OF ZNO / CUO HETEROSTRUCTURE CAUSED BY LASER-INDUCED VIBRATION ACTION</b> .....	546
<i>Serguei P. Murzin, Aleksandr N. Kryuchkov</i>	
<b>STUDY OF CU-ZN ALLOY OBJECTS VIBRATION CHARACTERISTICS DURING LASER-INDUCED NANOPORES FORMATION</b> .....	552
<i>Serguei P. Murzin, Andrey B. Prokofiev, Artur I. Safin</i>	
<b>NUMERICAL AND ANALYTICAL EVALUATION OF SERVICE LIFE OF THE DETAILS OF AXIAL PISTON HYDRAULIC MACHINES WITH COMPLICATED CONFIGURATION UNDER CYCLIC LOADING</b> .....	557
<i>V. Zheglova, Yu. Khomiak, S. Medvedev, I. Nikolenko</i>	
<b>INVESTIGATION OF THE RING VIBRATION ISOLATOR, THE CHARACTERISTICS OF WHICH ARE REGULATED BY CHANGING THE RADIUS OF CURVATURE AND ANGLE OF COVERAGE</b> .....	567
<i>Vladimir S. Melentjev, Alexander S. Gvozdev, Sergey A. Bezborodov</i>	
<b>SUPPRESSION OF GAS-DYNAMIC SELF-OSCILLATIONS IN THE OUTFLOW LINE OF A GAS CONTROL VALVE</b> .....	577
<i>Maxim V. Balyaba, Mikhail A. Ermilov, Alexander N. Kryuchkov</i>	
<b>DEVELOPMENT METHODOLOGY FOR A PULSATION DAMPER OF GAS CONTROL VALVES</b> .....	586
<i>Maxim V. Balyaba, Mikhail A. Ermilov, Alexander N. Kryuchkov</i>	
<b>IMPLEMENTATION OF THE ADDITIVE POLYJET TECHNOLOGY TO THE DEVELOPMENT AND FABRICATING THE SAMPLES OF THE ACOUSTIC METAMATERIALS</b> .....	595
<i>Roman Vdovin, Tatiana Tomilina, Vitaly Smelov, Maria Laktionova</i>	
<b>THE FLUID POWER ELEMENTS AND SYSTEMS MADE OF PLASTICS</b> .....	600
<i>J. Stryczek, M. Banas, J. Krawczyk, L. Marciniak, P. Stryczek</i>	
<b>EQUIVALENT VIBRATION TESTS</b> .....	610
<i>Igor Ovchinnikov, Peter Brancevich</i>	
<b>SPECIAL FEATURES OF INTERNAL SURFACES CLEANING PROCESSES CONTROL IN PIPELINES AND UNITS OF HYDRO-FUEL SYSTEMS</b> .....	618
<i>Valery I. Sanchugov, Victor M. Reshetov</i>	
<b>CHOICE OF STRUCTURAL PARAMETERS OF ROTARY SEAL MADE FROM MR-MATERIAL</b> .....	628
<i>A. M. Zhizhkin, V. A. Zrelov, V. V. Zrelov, A. Yu. Ardakov, A. A. Osipov</i>	
<b>EXPERIMENTAL VIBROACOUSTIC RESEARCH OF A GEAR PUMP MADE OF DIFFERENT MATERIALS</b> .....	636
<i>Leonid Rodionov, Pavel Rekadze</i>	
<b>DEVICE FOR CONTROL OF APERTURES SURFACE OF PIPES OF OIL ASSORTMENT</b> .....	645
<i>S. R. Abulhanov, S. B. Popov, N. A. Ivliev, V. V. Podlipnov</i>	
<b>CONTROL ALGORITHM DESIGN OF THE ACTIVE PNEUMATIC VIBRATION ISOLATOR</b> .....	653
<i>Peter V. Kosenkov, Georgy M. Makaryants</i>	
<b>REDUCING FRICTION DRAG ON FLAT PLATES</b> .....	661
<i>Nikolay Klyuev, Yuriy Kryukov, Asgat Gimadiev</i>	
<b>NEW METHODS AND APPROACHES TO ACOUSTIC MONITORING AND NOISE MAPPING OF URBAN TERRITORIES AND EXPERIENCE OF IT APPROBATION IN CONDITIONS OF SAMARA REGION OF RUSSIA</b> .....	669
<i>Andrey V. Vasilyev</i>	
<b>AIR FLOW CONTROL AROUND THE CYLINDRICAL ROTATING MODEL BY MEANS OF ROTATING ELECTRIC ARC IN AN EXTERNAL MAGNETIC FIELD</b> .....	675
<i>D. Munhoz, I. P. Zavershinskii, A. I. Klimov, N. E. Molevich, I. A. Moralev, L. A. Polyakov, D. P. Porfiriev, S. S. Sugak</i>	

<b>THE FINITE ELEMENT TECHNIQUE FOR MODELLING OF PIPE SYSTEM VIBROACOUSTICAL CHARACTERISTICS .....</b>	<b>681</b>
<i>Tatiana B. Mironova, Andrey B. Prokofiev, Victor Y. Sverbilov</i>	
<b>STUDY OF COIL HEAT EXCHANGER OF MECHATRONIC SAMPLE CONDITIONING SYSTEM.....</b>	<b>689</b>
<i>A. G. Gimadiev, A. V. Utkin</i>	
<b>PNEUMATIC VALVE'S SEAL DYNAMIC LOAD .....</b>	<b>699</b>
<i>Salimzhan A. Gafurov, Vera A. Salmina, Yuri I. Kondrashov</i>	
<b>THE MUFFLER PERFORMANCE EFFECT ON PRESSURE REDUCING VALVE DYNAMICS.....</b>	<b>706</b>
<i>Dmitry M. Stadnik, Alexander A. Igolkin, Victor Y. Sverbilov, Kirill M. Afanasev</i>	
<b>A METHOD FOR SIZING NOISE PROTECTIVE UNIT DESIGN FEATURES .....</b>	<b>718</b>
<i>Pavel A. Popov, Roman V. Zimnyakov, Alexander A. Igolkin</i>	
<b>THE STUDY ON VIBROACOUSTIC CHARACTERISTICS OF SHUNTING LOCOMOTIVE CABIN .....</b>	<b>724</b>
<i>Alexander A. Igolkin, Alexander N. Kryuchkov, Gennadiy V. Lazutkin, Kirill M. Afanasev</i>	
<b>OPTIMAL CONTROL OF AN UNDERWATER GLIDER VEHICLE .....</b>	<b>732</b>
<i>Renan Da Silva Tchilian, Elvira Rafikova, Salimzhan A. Gafurov, Marat Rafikov</i>	
<b>Author Index</b>	