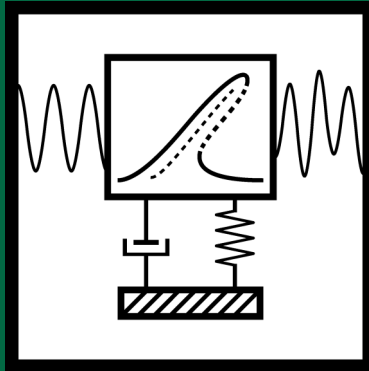


June 2021, Volume 38
ISSN Print 2345-0533
ISSN Online 2538-8479

Vibroengineering PROCEDIA



Editor in Chief

Minvydas Ragulskis

Kaunas University of Technology, (Lithuania)

minvydas.ragulskis@ktu.lt

Editorial Board

Mahmoud Bayat

Roudehen Branch, Islamic Azad University, (Iran)

mbayat14@yahoo.com

Rafał Burdzik

Silesian University of Technology, (Poland)

rafal.burdzik@polsl.pl

Jinde Cao

Southeast University, (China)

jdcao@seu.edu.cn

Maosen Cao

Hohai University, (China)

cmszhy@hhu.edu.cn

Sezgin Ersoy

Marmara University, (Turkey)

ersoy@marmara.edu.tr

W. H. Hsieh

National Formosa University, (Taiwan)

allen@nfu.edu.tw

Vassilis Kappatos

Center for Research and Technology Hellas, (Greece)

vkappatos@certh.gr

Chen Lu

Beihang University, (China)

luchen@buaa.edu.cn

Luis E. Muñoz

Universidad de los Andes, (Colombia)

lui-muno@uniandes.edu.co

Nicola Nisticò

Sapienza University of Rome, (Italy)

nicola.nistico@uniroma1.it

Vytautas Ostaševičius

Kaunas University of Technology, (Lithuania)

vytautas.ostasevicius@ktu.lt

Grigory Panovko

Mechanical Engineering Research Institute of the Russian Academy of Sciences, (Russia)

gpanovko@yandex.ru

Subhash Rakheja

Concordia University, (Canada)

subhash.rakheja@concordia.ca

Vinayak Ranjan

Bennett University, (India)

vinayak.ranjan@bennett.edu.in

G. Eduardo Sandoval-Romero

The National Autonomous University of Mexico, (Mexico)

eduardo.sandoval@ccadet.unam.mx

Miguel Angel Fernandez Sanjuan

University Rey Juan Carlos, (Spain)

miguel.sanjuan@urjc.es

Gangbing Song

University of Houston, (USA)

gsong@uh.edu

Shigeki Toyama

Tokyo A&T University, (Japan)

toyama@cc.tuat.ac.jp

Piotr Vasiljev

Lithuanian University of Educational Sciences, (Lithuania)

piotr.vasiljev@leu.lt

Vincentas Veikutis

Lithuanian University of Health Sciences, (Lithuania)

vincentas.veikutis@ismuni.lt

Jānis Vība

Riga Technical University, (Latvia)

janis.viba@rtu.lv

Xiao-Jun Yang

China University of Mining and Technology, (China)

dyangxiaojun@163.com

Krzysztof Kamil Żur

Białystok University of Technology, (Poland)

k.zur@pb.edu.pl

VP Vibroengineering PROCEEDIA

Vibroengineering PROCEEDIA Volume 38 contains papers presented at the 52nd International Conference on VIBROENGINEERING held in St. Petersburg, Russia, June 28-30, 2021. The main theme of the Conference is “Nonlinear Dynamics and Chaos in Engineering Applications”.

Aims and Scope

Journal publishes original papers presenting the state of the art in vibroengineering of dynamical systems. The list of principal topics:

- Measurements in engineering
- Mathematical models in engineering
- Acoustics, noise control and engineering applications
- Mechanical vibrations and applications
- Fault diagnosis based on vibration signal analysis
- Vibration generation and control
- Seismic engineering and applications
- Modal analysis and applications
- Vibration in transportation engineering
- Flow induced structural vibrations
- Oscillations in biomedical engineering
- Chaos, non-linear dynamics and applications
- Oscillations in electrical engineering
- Fractional dynamics and applications
- System dynamics in manufacturing system modeling
- Dynamics of smart and functionally graded materials

All published papers are peer reviewed and crosschecked by plagiarism detection tools.

More information is available online <https://www.jvejournals.com>

Vibroengineering PROCEEDIA is referred in:

SCOPUS: ELSEVIER Bibliographic Database.

COMPENDEX: ELSEVIER Bibliographic Database.

EBSCO: Academic Search Complete;

Computers & Applied Sciences Complete;

Central & Eastern European Academic Source;

Current Abstracts;

TOC Premier.

GALE Cengage Learning:

Academic OneFile Custom Periodical;

Science in Context.

INSPEC: OCLC. The Database for Physics, Electronics and Computing.

SEMANTIC SCHOLAR: <https://www.semanticscholar.org>

GOOGLE SCHOLAR: <https://scholar.google.com>

CNKI SCHOLAR: <http://eng.scholar.cnki.net>

ULRICH'S PERIODICALS DIRECTORY: <https://ulrichsweb.serialssolutions.com>

CORE: <https://core.ac.uk>

cnpLINKer (CNPIEC): <http://cnplinker.cnpeak.com>

CROSSREF: <https://www.crossref.org>

Internet: <https://www.jveconferences.com>; <https://www.jvejournals.com>

E-mail: info@jveconferences.com; publish@jvejournals.com

Address: Geliu ratas 15A, LT-50282, Kaunas, Lithuania

Publisher: JVE International Ltd.

VP Vibroengineering PROCEDIA

JUNE 2021. VOLUME 38, PAGES (1-197), ISSN PRINT 2345-0533, ISSN ONLINE 2538-8479

Contents

MECHANICAL VIBRATIONS AND APPLICATIONS

- MODELLING THE OPERATION OF VIBRATORY MACHINE FOR SINGLE-SIDED LAPPING OF FLAT SURFACES** 1
VITALIY KORENDIY, VIKTOR ZAKHAROV, VOLODYMYR GUREY,
PETRO DMYTERKO, IURII NOVITSKYI, OLEKSANDR HAVRYLCHENKO
- PROSPECTS FOR VIBROMECHANICAL SPHEROIDIZATION OF METAL POWDERS** 7
ALEXANDER SAMUKOV, MARGARITA CHERKASOVA, MAKSIM KUKSOV,
SERGEI DMITRIEV
- MATHEMATICAL MODELLING OF FORCED OSCILLATIONS OF CONTINUOUS MEMBERS OF RESONANCE VIBRATORY SYSTEM** 13
OLEKSANDR KACHUR, OLEKSII LANETS, VITALIY KORENDIY,
VASYL LOZYNSKYI, OLEH KOTSUMBAS, OLEKSANDR HAVRYLCHENKO,
NADIIA MAHERUS
- MODELING OF CHATTER VIBRATIONS IN GUN DRILLING PROCESS** 19
SERGEY VORONOV, IVAN PLESHCHEEV
- FAULT DIAGNOSIS BASED ON VIBRATION SIGNAL ANALYSIS
- AN IMPROVED ADAPTIVE VMD METHOD AND ITS APPLICATION IN WEAR CONDITION MONITORING OF MAIN BEARING** 26
JIDE JIA, GANG REN
- DETECTION AND ANALYSIS OF METAL SCRAP IN LUBRICATING OIL BASED ON WEAR FAULT OF SPINDLE BEARING OF TURBOSHAFT ENGINE** 32
TENGQIANG WANG, YINGFU GUO, GUANGBIN WANG, XIAOHUI WANG

SEISMIC ENGINEERING AND APPLICATIONS

- RESPONSE SPECTRUM METHOD FOR SPATIAL SEISMIC GROUND MOTION** **38**
 ELENA POZNYAK, VIKTOR CHIRKOV, ALEXEI BUGAEVSKY, VALERY SIMBIRKIN,
 VICTOR KURNAVIN

VIBRATION IN TRANSPORTATION ENGINEERING

- APPLICATION OF MACHINE LEARNING METHOD TO CONTROL THE VIBRATION OF THE
 CAR'S SUSPENSION SYSTEM** **44**
 HUAXIANG ZHOU, VANLIEM NGUYEN, RENQIANG JIAO, YUAN HUAN

BIOMECHANICS AND BIOMEDICAL ENGINEERING

- LASER SPECKLE CONTRAST IMAGING AND MACHINE LEARNING IN APPLICATION TO
 PHYSIOLOGICAL FLUIDS FLOW RATE RECOGNITION** **50**
 IVAN STEBAKOV, ELENA KORNAEVA, DMITRY STAVTSEV, ELENA POTAPOVA,
 VIKTOR DREMIN

- IMPROVED 3D BIOMECHANICAL MODEL FOR EVALUATION OF MASS AND INERTIAL
 PARAMETERS IN FEW BODY POSITIONS FROM NASA CLASSIFICATION** **56**
 GERGANA NIKOLOVA, MIHAIL TSVEOV, DANIEL DANTCHEV, VLADIMIR KOTEV

DYNAMICS AND OSCILLATIONS IN ELECTRICAL AND ELECTRONICS
 ENGINEERING

- ONBOARD COMPUTING ENVIRONMENT OF AUTONOMOUS UNMANNED UNDERWATER
 VEHICLES: POSSIBLE DESIGN TECHNOLOGIES AND THEIR COMPARATIVE ANALYSIS** **62**
 YURI SIEK, NIKITA ZHURBA, EKATERINA KHUTORNAIA

ACOUSTICS, NOISE CONTROL AND ENGINEERING APPLICATIONS

- A METHOD OF SOUND SOURCE RECOGNITION BASED ON TOW WEAK SELECTION
 COMPRESSED SENSING** **68**
 YUXI CHEN, JIN MAO, YAHUI CUI

- EXPERIENCE OF ESTIMATION OF NEGATIVE IMPACT OF NOISE TO THE HUMAN HEALTH
 IN CONDITIONS OF URBAN TERRITORIES** **75**
 ANDREY V. VASILYEV

MATERIALS AND MEASUREMENTS IN ENGINEERING

- A NOVEL CALCULATION EXPRESSION FOR THE EXPERIMENTAL FRICTION
 COEFFICIENT OF THE BALL SCREW** **80**
 YISHEN ZHANG, CHANGGUANG ZHOU, HUTIAN FENG

- RESEARCH ON THE EFFECT OF THE CHARGE DIAMETER ON THE SLOW COOK-OFF
 PERFORMANCE OF HMX BASE EXPLOSIVE** **85**
 YANG JIAN, JIN PENGANG, LI HONGBIN, REN SONGTAO

METHODOLOGY OF ERROR MEASUREMENTS REDUCTION WHILE DETERMINING INTEGRATED ERRORS OF SATELLITE NODES OF PLANETARY GEARS	90
DMITRY NASONOV, VLADIMIR RAEVSKY, VLADIMIR ILICHEV, ANZHELIKA VOLKHONSKAYA	
EXPERIMENTAL MEASUREMENT OF THERMAL SHOCK WAVE IN C/PH INDUCED BY ELECTRON BEAM RADIATION	95
YAN-JIA LIN, PENG LIN	
A NEW MECHANICAL AND MAGNETIC COUPLING MODEL OF MAGNETIC MEMORY	101
SHUJUN LIU, QIWEI YONG, DEAN HE, YONGGANG ZUO, ZHEN ZHANG, GUODONG ZENG	
A NEW FEATURE OF MAGNETIC MEMORY SIGNAL FOR QUANTITATIVE IDENTIFICATION OF STRESS CONCENTRATION	107
SHUJUN LIU, QIWEI YONG, DEAN HE, YONGGANG ZUO, ZHEN ZHANG, GUODONG ZENG	
ANALYSIS OF UNCERTAINTY RELATION OF PIN-SHAFT FITTING IN MECHANICAL SYSTEM WITH CLEARANCE	113
ZHENGKAI CHU, DONGFANG HU	
SOME RESULTS OF EXPERIMENTAL RESEARCH OF LOW FREQUENCY GAS DYNAMIC PULSATIONS IN PIPELINES OF COMPRESSOR MOUNTS	119
ANDREY V. VASILYEV	
MATHEMATICAL MODELS IN ENGINEERING	
STUDY ON TEMPERATURE CONTROL AND CRACK RESISTANCE OF MASS CONCRETE ANCHORAGE IN SUSPENSION BRIDGE	124
SHUYANG LIU, ZEWEI YIN	
NUMERICAL STUDY OF THE EFFECTS OF AC VOLTAGE AMPLITUDE AND FREQUENCY ON SPACE CHARGE DYNAMICS IN POLYETHYLENE	129
DAN PANG, YIZHU ZHANG, CHANGPENG ZHAO, XIN XU, ZHIWEI LU, XINJING CAI	
NUMERICAL SIMULATION OF PNEUMATIC CONVEYING CHARACTERISTICS OF MICRON PARTICLES IN HORIZONTAL PIPE	135
SI QIN, XIAOJUN ZHOU	
DYNAMIC OF A CYLINDRICAL COLUMN ON A VIBRATING BASE	142
MUNITSYN ALEXANDER, MUNITSYNA MARIA	
FAST CALCULATION METHOD OF DIRECTLY BURIED CABLES AMPACITY	148
DAN PANG, YIZHU ZHANG, YANYANG LI, YINGMING ZHOU, ZHIWEI LU, MINGZE QI	
COMPUTER SIMULATION OF MEFP FORMING AND THE IMPACT INITIATION OF SHELL-COVERED CYLINDRICAL CHARGE	154
XIN WANG, ZHIYONG QIN, JUAN GU, CHONG JI, CHANGXIAO ZHAO	
SYSTEM DYNAMICS IN MANUFACTURING SYSTEM MODELING	
RESEARCH ON KEY TECHNOLOGY OF AUTOMATIC LOADING AND UNLOADING OF DUAL PIPE DIRECTIONAL DRILLING	161
KUN LI, YAFENG YAO	

SOME RECOMMENDATIONS FOR THE CALCULATION OF PNEUMATIC ENGINES TAKING INTO ACCOUNT THE SMOOTH STOP	166
VLADIMIR RAEVSKY, DMITRY NASONOV, VLADIMIR ILICHEV	
ACTIVE REDUCTION OF MAGNETIC NOISE OCCURRING IN THE STATORS OF AN INDUCTION MOTORS	172
ARTEM ERMOLAEV, VLADIMIR EROFEEV, ALEXANDR PLEKHOV, DMITRIY TITOV	
ENSURING THE CHATTER STABILITY OF MILLING BY OPTIMIZING THE WORKPIECE STOCK	179
VLADIMIR KUTS, IGOR KISELEV, SERGEY VORONOV	
A STOCHASTIC MODEL OF PLANE GRINDING DYNAMIC FOR THE TEXTURE FORMATION ANALYSIS	185
SERGEY A. VORONOV, IGOR A. KISELEV, IRINA S. VORONOVA	
DYNAMICS OF SMART AND FUNCTIONALLY GRADED MATERIALS	
THE EXPERIMENTAL STUDY OF ELASTIC-HYSTERESIS PROPERTIES OF RUBBER ELEMENTS OF SLEEVE-PIN COUPLINGS	193
DMITRY NASONOV, VLADIMIR ILICHEV, VLADIMIR RAEVSKY	

