

# Mechanisms and Machine Science

Volume 8

*Series Editor*

Marco Ceccarelli

For further volumes:

<http://www.springer.com/series/8779>

Jaroslav Beran · Martin Bílek  
Monika Hejnova · Petr Zabka  
Editors

# Advances in Mechanisms Design

Proceedings of TMM 2012

*Editors*

Jaroslav Beran  
Textile Machine Design Department  
Technical University of Liberec  
Liberec  
Czech Republic

Monika Hejnova  
Textile Machine Design Department  
Technical University of Liberec  
Liberec  
Czech Republic

Martin Břlek  
Textile Machine Design Department  
Technical University of Liberec  
Liberec  
Czech Republic

Petr Zabka  
Textile Machine Design Department  
Technical University of Liberec  
Liberec  
Czech Republic

ISSN 2211-0984

ISBN 978-94-007-5124-8

DOI 10.1007/978-94-007-5125-5

Springer Dordrecht Heidelberg New York London

ISSN 2211-0992 (electronic)

ISBN 978-94-007-5125-5 (eBook)

Library of Congress Control Number: 2012943369

© Springer Science+Business Media Dordrecht 2012

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))



Technical University of Liberec  
Studentská 1402/2  
461 17 Liberec 1  
Czech Republic  
<http://www.tul.cz>



Czech Society of Mechanics  
Dolejšková 5  
182 00 Praha 8  
Czech Republic  
<http://www.csm.cz>



IFToMM  
International Federation for the Promotion  
of Mechanism and Machine Science  
<http://www.iftomm.org>  
Czech National Committee of IFToMM  
Institute of Thermomechanics AS CR, v. v. i.,  
Dolejšková 5  
182 00 Praha 8  
Czech Republic  
<http://www.it.cas.cz/IFToMM-TC-NO/>



VÚTS, a.s.  
U Jezu 525/4  
461 19 Liberec 1  
Czech Republic  
<http://www.vuts.cz>

# Scientific Committee

J. Beran—Chairman, Czech Republic  
M. Bílek—Secretary, Czech Republic  
V. Arakelyan, France  
T. Březina, Czech Republic  
M. Ceccarelli, Italy  
B. Corves, Germany  
L. Frýba, Czech Republic  
J.C. Garcia-Prada, Spain  
V. Goldfarb, Russia  
A. Gronowicz, Poland  
J. Horáček, Czech Republic  
C. Kratochvíl, Czech Republic  
T. Leinonen, Finland  
M. Lima, Portugal  
E.CH. Lovasz, Romania  
K. Luck, Germany  
E. Macha, Poland  
K.H. Molder, Germany  
V. Natarajan, India  
L. Pešek, Czech Republic  
L. Půst, Czech Republic  
Š. Segľa, Slovakia  
B. Shchokin, Ukraine  
J. Stadnicki, Poland  
I. Tempea, Romania  
D. Tesar, USA  
M. Václavík, Czech Republic  
M. Valášek, Czech Republic  
J. Zapoměl, Czech Republic  
V. Zeman, Czech Republic

# Preface

The international conference on the theory of machines and mechanisms has been held since 1973 in regular 4-year intervals. The expert agenda of the conference focuses on a wide range of problems including theoretical and practical findings related to theories pertaining to machines and mechanisms. The person involved in the creation of this conference was an important personality and leading expert in mechanics and mechanism theories—Prof. Jaroslav Charvát. He was not only a renowned expert regarding mechanism theories, but he was also an excellent teacher and promoter of mechanics for the professional and lay public.

The 11th International Conference on the Theory of Machines and Mechanisms was held from 4 to 6 September 2012 at the Liberec Technical University, Liberec, Czech Republic. The conference was organized under the auspices of the Czech National Committee for Theories of Machines and Mechanisms IFToMM, the Czech Society for Mechanics, and the Textile Machines Research Institute Liberec. The lectures focused particularly on the areas of analysis, synthesis of articulated, cam, planar, and spatial mechanisms.

A major part included a focus on problems related to the dynamics of machines and mechanisms as well as mechatronic and biomechanical systems. Robotic systems were another major focus of the conference.

During the conference, the Meeting of the Technical Committee for Linkages and Mechanical Controls of IFToMM and the Meeting of the Czech Society for Mechanics took place.

In this book contributions from the conference have been included in seven main sections:

- General Theory of Machines and Mechanisms
- Analysis and Synthesis of Planar and Spatial Mechanisms, Linkages, and Cams
- Dynamics of Machines and Mechanisms, Rotor Dynamics, Vibration and Noise in Machines, Computational Mechanics
- Robots and Manipulators

- Biomechanics
- Optimization of Mechanisms and Machines, The Mechanisms of Textile Machines
- Mechatronics, Control and Monitoring Systems of Machines

As it has for more than 39 years, this volume of proceedings offers both a broad perspective on the state of the art in the field as well as an in-depth look at its leading edge research. It is our privilege to be able to offer this collection and we express our sincere thanks to the contributing authors for making this series a continuing success.

We appreciate the interest in this conference and believe it will bring many suggestions for further extension of knowledge in the field of machines and mechanisms theory and will provide new ideas for international cooperation in this field.

Jaroslav Beran

# Contents

## Part I General Theory of Machines and Mechanisms

<b>Mobile Wheel-Legged Robot: Researching of Suspension Leveling System</b> . . . . .	3
J. Bałchanowski	
<b>Comparison of Alternative Equivalent Circuits of Induction Motor with Real Machine Data</b> . . . . .	13
J. Bradna, J. Bauer, S. Fligl and V. Hlinovsky	
<b>Band Mechanism with Nonlinear Gear Ratio for Gravity Force Balance: Design and Analysis in Total System Network</b> . . . . .	21
F. Ebert and M. Berger	
<b>Application of the Research Environment e-Kinematix in Mechanism Development</b> . . . . .	27
G. Lonij, B. Corves, M. Reeßing and M. Razum	
<b>Advanced Digitization Techniques in Retrieval of Mechanism and Machine Science Resources</b> . . . . .	35
E-Ch. Lovasz, C. M. Gruescu, V. Ciupe, I. Carabas, D. Margineanu, I. Maniu and N. Dehelean	
<b>Trends in Development of Positioning Mechanisms</b> . . . . .	43
F. Paľčák	
<b>New Models of Mechanisms for the Motion Transformation</b> . . . . .	49
Tomislav Petrović and Ivan Ivanov	



<b>Structural Synthesis of a Class of the Parallel Mechanisms Providing Plane-Parallel Displacement of a Mobile Platform. . . . .</b>	57
L. Rybak, A. Chichvarin, R. Sidorenko and J. Šklřba	
<b>Development of a Wearable Assist Robot for Walk Rehabilitation After Knee Arthroplasty Surgery. . . . .</b>	65
H. Terada, Y. Zhu, K. Horiguchi, M. Nakamura and R. Takahashi	
<b>Modeling of Lifting Equipment with Backlash Consideration . . . . .</b>	73
J. Vondrich and E. Thöndel	
<b>Analysis of Automatic Automotive Gear Boxes by Means of Versatile Graph-Based Methods. . . . .</b>	81
J. Drewniak, J. Kopeć and S. Zawiślak	
 <b>Part II Analysis and Synthesis of Planar and Spatial Mechanisms, Linkages and Cams</b>	
<b>Direct and Inverse Kinematic of 3DOF Parallel Mechanism with Singularity Analysis. . . . .</b>	89
J. Bałchanowski	
<b>Measuring of Radial Cams Contours . . . . .</b>	97
V. Crhak	
<b>High-Speed Parallel Shaft Indexing Drive . . . . .</b>	105
P. Dostrařil, F. Hartig, M. Václavřk and P. Jirásko	
<b>A Simplified Design with a Toothed Belt and Non-circular Pulleys to Separate Parts from a Magazine File. . . . .</b>	113
U. Hanke, K.-H. Modler, R. Neumann and C. Fischer	
<b>Path Generation of Regular Polygon Using a Geared-Parallelogram Mechanism . . . . .</b>	121
S. Lin, Y. Fan, Z. Ren and U. Hanke	
<b>MOCAD: A Tool for Graphical and Interactive Calculation and Optimization of Cam Mechanisms and Motion Control Systems. . .</b>	129
A. Heine and M. Berger	
<b>Efficiency of Integrated Anti-Backlash Designed Planetary Gearbox . . . . .</b>	137
V. Klouček	

**Numerical Method for Determination of Base Circle Radius of Cam Mechanisms with Oscillating Flat-Face Follower . . . . .** 143  
 E.-C. Lovasz, D. Perju, C. M. Gruescu, K.-H. Modler, Cărbăș I and E. S. Zăbavă

**Analytical Displacement and Velocity Modeling of the RSSR-SS Linkage . . . . .** 151  
 Q. Shen, K. Russell and R. S. Sodhi

**Part III Dynamics of Machines and Mechanisms, Rotor Dynamics, Vibration and Noise in Machines, Computational Mechanics**

**Shaking Force Minimization of High-Speed Robots via Optimal Trajectory Planning . . . . .** 159  
 S. Briot, V. Arakelian and J.-P. Le Baron

**Nonlinear Antiresonance Vibrating Screen . . . . .** 167  
 V. N. Belovodskiy, S. L. Bukin and M. Y. Sukhorukov

**Modeling and Simulation of a Slider Crank Mechanism with a Flexible Extensible Link . . . . .** 175  
 M. Dupac and S. Noroozi

**Multipoint Contact Approach to the Analysis of Interacting Flexible Bodies Vibration . . . . .** 181  
 M. Hajžman and D. Rycheký

**Dynamic Analysis of Resonance: Bifurcation Characteristics of Non-linear Parametric Systems . . . . .** 187  
 M. Hortel, A. Škuderová, C. Kratochvíl and M. Houfek

**Control of Compliant Mechanisms with Large Deflections . . . . .** 193  
 D. Kern, J. Bauer and W. Seemann

**About Problems of Nonlinear Dynamics of the Elastic Rod Elements in Practice of Chisel Works . . . . .** 201  
 L. Khajiyeva

**Dynamic Analysis of Hammer Mechanism “Twin Hammer” of Impact Wrench . . . . .** 209  
 M. Konečný and J. Slavík

<b>Forces and Moments Acting on the Fluttering Profile . . . . .</b>	217
J. Kozánek, V. Vlcek and I. Zolotarev	
<b>Rotor-Liquid-Fundament System's Oscillation . . . . .</b>	223
A. Kydyrbekuly	
<b>Simulations of Radiation Heat Transfer in Design of Alternative Infrared Emitters . . . . .</b>	231
J. Loufek	
<b>Creating a Mathematical Model for Solving Chatter and Dealing the Problems Concerning the Maximum Allowable Size of a Machining Chip . . . . .</b>	237
J. Ondrášek	
<b>Impact of Thermal Stresses on Micro-Fabricated Devices Used for Optical Applications . . . . .</b>	245
K. Malinauskas, V. Ostasevicius and R. Dauksevicius	
<b>Exponential Damping as an Approach to Internal Hysteretic Damping of Rotor Systems: FEM Model of Timoshenko Rotating Beam with Maxwell-Weichert Damping Model . . . . .</b>	253
Antonín Skarolek	
<b>Contribution to Numerical Analysis of Uncertain Mechanical Systems Using Probability and Possibility Theory . . . . .</b>	263
M. Vaško, M. Sága and V. Dekýš	
<b>Reducing the Steady State Vibrations of Flexible Rotors by Squeezing Thin Layers of Normal and Magneto Rheological Oils . . . .</b>	271
J. Zapoměl and P. Ferfecki	
 <b>Part IV Robots and Manipulators</b>	
<b>Development of an Upper Limb Motorized Assistive-Rehabilitative Robot . . . . .</b>	281
Masoud Amiri and Federico Casolo	
<b>Workspace Evaluation for Analysis and Synthesis of Manipulators . . .</b>	289
M. Ceccarelli	

<b>The Force Reaction Control of the Wheel-Legged Robot's Limb Prototype</b> . . . . .	303
A. Gronowicz, J. Szrek and S. Wudarczyk	
<b>Method for Planning the Finger's Movement in the Anthropomorphic Manipulator Hand-K3, Using a Tactile Sensors Network, with the Aim of Optimal Grasping</b> . . . . .	309
A. Handke and W. Twaróg	
<b>Development of Spherical Ultrasonic Motor as a Camera Actuator for Pipe Inspection Robot</b> . . . . .	317
M. Hoshina and S. Toyama	
<b>Research on Multi-Directional Pose Accuracy Variation to a Welding Robot</b> . . . . .	323
V. Vacarescu, E. Ch. Lovasz and C. F. Buciuman	
 <b>Part V Biomechanics</b>	
<b>Inverse Dynamics Model for the Ankle Joint with Applications in Tibia Malleolus Fracture</b> . . . . .	331
E. Budescu, E. Merticaru and M. Chirazi	
<b>Dynamic Characteristics of Prosthetic Feet: A Comparison Between Modal Parameters of Walking, Running and Sprinting Foot</b> . . . . .	339
S. Noroozi, A. G. A. Rahman, M. Dupac and J. E. Vinney	
<b>Biomechanical Solutions in Tibial Malleolus Fracture</b> . . . . .	345
C. Oprisan, E. Budescu and V. Cotoros	
<b>Validation of Human Body Model VIRTHUMAN and its Implementation in Crash Scenarios</b> . . . . .	351
Ing. Jaroslav Mañas, Ing. Luděk Kovář, Ing. Jan Petřík, Ing. Hana Čechová and Ing. Stanislav Špirk	
<b>Numerical Simulation of the Self-Oscillations of the Vocal Folds and of the Resulting Acoustic Phenomena in the Vocal Tract</b> . . . . .	357
P. Švancara, J. Horáček and J. G. Švec	

**Part VI Optimization of Mechanisms and Machines,  
The Mechanisms of Textile Machines**

<b>Analysis of Heald Motion During of Weaving Process</b> . . . . .	367
M. Bilek	
<b>Kinematic Design and Ideal Dimensioning of New Highly Dynamic Drive Assemblies for Knitting and Braiding Machines</b> . . . . .	375
D. Denninger, M. Berger and A. Heine	
<b>Analysis of the Loop Spinning System</b> . . . . .	383
J. Beran and M. Hejnova	
<b>Adjusting the Chain Gear</b> . . . . .	393
Z. Koloc, J. Korf and P. Kavan	
<b>Modification of Upper Thread Tensioner of Sewing Machine</b> . . . . .	401
P. Klouček and P. Škop	
<b>Optimization of Car Seats in the Interaction of Sitting Man on the Size of the Contact Pressure</b> . . . . .	407
R. Martonka and V. Fliegel	
<b>Trajectories of Dop Points on a Machining Wheel During Grinding of High Quality Plane Surfaces</b> . . . . .	413
I. Petrikova, R. Vrzala and J. Kafka	
<b>A Design and Optimization of the Fully Automatic Shunting Mechanism</b> . . . . .	421
A. Sapietova and V. Dekys	
<b>Modelling and Optimization of the Half Model of a Passenger Car with Magnetorheological Suspension System</b> . . . . .	429
S. Segla	
<b>Optimization of Industrial Sewing Machine Balancing Using Adams and Mathematica Software</b> . . . . .	437
P. Šidlof and J. Ondrášek	
<b>Application of the Impact-Free Lift Dependence in Small-Diameter Knitting Machines.</b> . . . . .	445
J. Skřivánek and M. Bilek	

**The Optimal Design of an Auxiliary Switch for an Internal Combustion Engine Starter . . . . .** 451  
 J. Stropnik

**Construction for High Pressure Application on 3D Nanofibers . . . . .** 459  
 L. Ševčík and D. Vejrych

**Dynamic Properties of Traversing Rod . . . . .** 469  
 P. Žabka, J. Valtera and J. Beran

**Flexible Elements in the Mechanisms of Weaving Machines . . . . .** 475  
 J. Žák

**Part VII Mechatronics, Control and Monitoring Systems of Machines**

**New Conception of Waving Machine CamEl Drive. . . . .** 483  
 A. Bílkovský, O. Marek, P. Jirásko and Z. Volanský

**Application of Motion API for Input Production Data in a Single-Purpose Machine Tool with Control System by YASKAWA . . . . .** 489  
 P. Bureš

**The Conception of the Control System of Radial Cam Grinder. . . . .** 495  
 P. Jirásko, V. Crhák and P. Bureš

**An Analysis of Planetary Gearboxes for Their Use With Electronic Cam. . . . .** 501  
 P. Dostrašil, P. Jirásko and M. Bušek

**DC/DC Power Converter for Super-Capacitor Supplied by Electric Power Splitter . . . . .** 509  
 T. Haubert and P. Mindl

**Traction Control System for Formula Student Electric. . . . .** 517  
 Z. Houf, Z. Čeřovský and V. Hlinovský

**Electro Dermal Quantification of Some Dental Treatment's Efficiency . . . . .** 523  
 M. Mateas and E. Ianosi

**Servo Control Using Wave-Based Method** . . . . . 531  
O. Marek

**Drives Dynamic Models Implementation with Regard  
to Real-Time Simulation** . . . . . 537  
J. Opálka

**High Performance Real-Time Simulation for Control Systems  
Development on Fast but Ordinary PC** . . . . . 543  
J. Rameš

**Function Properties of Electronic Cam with Great Unevenness  
of Angular Speed** . . . . . 549  
P. Šidlof and P. Klouček

**Index** . . . . . 557

# Contributors

- M. Amiri** Politecnico di Milano, Milan, Italy
- V. Arakelian** Institut National des Sciences Appliquées de Rennes, Rennes, France
- J. Balchanowski** Wroclaw University of Technology, Wroclaw, Poland
- J. Bauer** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- V. Belovodskiy** Donetsk National Technical University, Donetsk, Ukraine
- J. Beran** Technical University of Liberec, Liberec, Czech Republic
- M. Berger** Technical University Chemnitz, Chemnitz, Germany
- M. Bílek** Technical University of Liberec, Liberec, Czech Republic
- A. Bílkovský** VÚTS, a.s., Liberec, Czech Republic
- J. Bradna** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- S. Briot** Institut de Recherches en Communications et Cybernétique de Nantes (IRCCyN), Nantes, France
- C.F. Buciuman** Politehnica University of Timisoara, Timisoara, Romania
- E. Budescu** Gh. Asachi Technical University, Iasi, Romania
- S.L. Bukin** Donetsk National Technical University, Donetsk, Ukraine
- P. Bureš** VÚTS, a.s., Liberec, Czech Republic
- M. Bušek** VÚTS, a.s., Liberec, Czech Republic
- I. Cărăbaș** Politehnica University of Timisoara, Timisoara, Romania
- F. Casolo** Politecnico di Milano, Milan, Italy



- M. Ceccarelli** University of Cassino and South Latium, Cassino, Italy
- Z. Čeřovský** Department of Electrical Drives and Traction, Faculty of Electrical Engineering, Czech Technical University in Prague, Prague, Czech Republic
- A. Chichvarin** Stary Oskol Technological Institute of National University of Science and Technology «MISIS», Stary Oskol, Russia
- M. Ciupe** Universitatea Politehnica din Timisoara, Timisoara, Romania
- B. Corves** RWTH Aachen University, Aachen, Germany
- V. Cotoros** Municipal Hospital Medgidia, Medgidia, Romania
- V. Crhák** VÚTS, a.s., Liberec, Czech Republic
- R. Dauksevicius** Kaunas University of Technology, Kaunas, Lithuania
- N. Dehelean** Universitatea Politehnica din Timisoara, Timisoara, Romania
- V. Dekýř** University of Žilina, Žilina, Slovakia
- D. Denninger** Chemnitz University of Technology, Chemnitz, Germany
- P. Dostrařil** VÚTS, a.s., Liberec, Czech Republic
- J. Drewniak** University of Bielsko-Biała, Bielsko-Biała, Poland
- M. Dupac** Bournemouth University, Poole, UK
- F. Ebert** Technical University Chemnitz, Chemnitz, Germany
- Y. Fan** Tongji University, Shanghai, China
- P. Ferfecki** VSB-Technical University of Ostrava, Ostrava, Czech Republic
- C. Fischer** Technische Universität Dresden, Dresden, Germany
- V. Fliegel** Technical University of Liberec, Liberec, Czech Republic
- S. Fligl** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- A. Gronowicz** Wrocław University of Technology, Wrocław, Poland
- C.M. Gruescu** Universitatea Politehnica din Timisoara, Timisoara, Romania
- M. Hajřman** University of West Bohemia, Plzeň, Czech Republic
- H. Čechová** University of West Bohemia, Plzeň, Czech Republic
- A. Handke** Wrocław University of Technology, Wrocław, Poland
- U. Hanke** Technical University of Dresden, Dresden, Germany
- F. Hartig** VÚTS, a.s., Liberec, Czech Republic

- T. Haubert** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- A. Heine** Chemnitz University of Technology, Chemnitz, Germany
- M. Hejnova** Technical University of Liberec, Liberec, Czech Republic
- V. Hlinovsky** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- J. Horáček** Institute of Thermomechanics, Academy of Sciences of the Czech Republic, Prague, Czech Republic
- K. Horiguchi** Graduate School of Medical and Engineering Science, University of Yamanashi, Tokyo, Japan
- M. Hortel** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic
- M. Hoshina** Tokyo University of Agriculture and Technology, Tokyo Noko Daigaku, 3-8-1 Harumi-cho, Fuchu-shi, Tokyo 183-8538, Japan
- Z. Houf** Czech Technical University in Prague, Faculty of Electrical Engineering, Technicka 2, Prague 6, 166 27 Prague, Czech Republic
- M. Houfek** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic
- E. Ianoi** University Politehnica of Timisoara, Timisoara, Romania
- I. Ivanov** Faculty of Mechanical Engineering, University of Niš, Medvedeva 14, 18000 Niš, Serbia
- J. Mañas** MECAS ESI s.r.o, Plzen, Czech Republic
- P. Jirásko** VÚTS, a.s., Liberec, Czech Republic
- J. Kafka** Technical University of Liberec, Liberec, Czech Republic
- P. Kavan** VÚTS, a.s., Liberec, Czech Republic
- D. Kern** Karlsruhe Institute of Technology, Karlsruhe, Germany
- L. Khajiyeva** Kazakh National University al-Farabi, Almaty, Kazakhstan
- P. Klouček** VÚTS, a.s., Liberec, Czech Republic
- V. Klouček** VÚTS, a.s., Liberec, Czech Republic
- Z. Koloc** VÚTS, a.s., Liberec, Czech Republic
- M. Konečný** Technical University of Liberec, Liberec, Czech Republic
- J. Kopeć** University of Bielsko-Biała, Bielsko-Biała, Poland
- J. Korf** VÚTS, a.s., Liberec, Czech Republic
- J. Kozanek** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic

- C. Kratochvíl** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic
- A. Kydyrbekuly** Kazakh National University, Almaty, Kazakhstan
- J.-P. Le Baron** Institut National des Sciences Appliquées de Rennes, Rennes, France
- S. Lin** Tongji University, Shanghai, China
- G. Lonij** RWTH Aachen University, Aachen, Germany
- J. Loufek** Technical University of Liberec, Liberec, Czech Republic
- E.CH. Lovasz** University Politehnica of Timisoara, Timisoara, Romania
- L. Kovář** MECAS ESI s.r.o, Plzen, Czech Republic
- K. Malinauskas** Kaunas University of Technology, Kaunas, Lithuania
- I. Maniu** Universitatea Politehnica din Timisoara, Timisoara, Romania
- O. Marek** VÚTS, a.s., Liberec, Czech Republic
- D. Margineanu** Universitatea Politehnica din Timisoara, Timisoara, Romania
- R. Martonka** Technical University of Liberec, Liberec, Czech Republic
- M. Mateas** Politehnica University of Timisoara, Timisoara, Romania
- E. Merticaru** Technical University of Iasi, Iasi, Romania
- P. Mindl** Czech Technical University, Prague, Czech Republic
- K.-H. Modler** Technische Universität Dresden, Dresden, Germany
- M. Nakamura** Kofu Municipal Hospital, Yamanashi, Japan
- R. Neumann** Technische Universität Dresden, Dresden, Germany
- S. Noroozi** Bournemouth University, Poole, UK
- J. Ondrášek** VÚTS, a.s., Liberec, Czech Republic
- J. Opálka** VÚTS, a.s., Liberec, Czech Republic
- C. Oprisan** Gh. Asachi Technical University, Iasi, Romania
- V. Ostasevicius** Kaunas University, Kaunas, Lithuania
- F. Palčák** Slovenska Technical University, Bratislava, Slovakia
- D. Perju** Politehnica University of Timisoara, Timisoara, Romania
- I. Petrikova** Technical University of Liberec, Liberec, Czech Republic
- T. Petrovic** University of Nis, Nis, Serbia

- J. Petřík** Technical University of Liberec, Liberec, Czech Republic
- A.G.A. Rahman** University Malaysia Pahang, Pahang, Malaysia
- J. Rameš** VÚTS, a.s., Liberec, Czech Republic
- M. Razum** FIZ Karlsruhe, Karlsruhe, Germany
- M. Reeßing** Ilmenau University of Technology, Ilmenau, Germany
- Z. Ren** China Tobacco Machinery Technology Center Co., Ltd (CTMTC), Shanghai, China
- K. Russell** New Jersey Institute of Technology, Newark, NJ, USA
- L. Rybak** Belgorod State Technological University named after V.G. Shoukhov, Belgorod, Russia
- D. Rycheký** University of West Bohemia, Plzeň, Czech Republic
- M. Sága** University of Žilina, Žilina, Slovakia
- A. Sapietová** Žilinská University, Žilina, Slovakia
- W. Seemann**
- S. Segla** Technical University of Liberec, Liberec, Czech Republic
- L. Ševčík** Technická Univerzita v Liberci, Liberec, Czech Republic
- Q. Shen** Emerson Network Power, Columbus, USA
- P. Šidlof** VÚTS, a.s., Liberec, Czech Republic
- R. Sidorenko** Stary Oskol Technological Institute of National University of Science and Technology «MISIS», Stary Oskol, Russia
- A. Skarolek** VÚTS, a.s., Liberec, Czech Republic
- J. Šklíba** Technical University of Liberec, Liberec, Czech Republic
- P. Škop** VUTS Liberec, a.s., Measuring Department, Liberec, Czech Republic
- J. Skřivánek** Technical University of Liberec, Liberec, Czech Republic
- A. Škuderová** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic
- J. Slavík** Technical University of Liberec, Liberec, Czech Republic
- R.S. Sodhi** New Jersey Institute of Technology, Newark, NJ, USA
- S. Špírk** University of West Bohemia, Plzeň, Czech Republic
- J. Stropnik** University of Ljubljana, Ljubljana, Slovenia
- M.Y. Sukhorukov** Donetsk National Technical University, Donetsk, Ukraine

- P. Švancara** Brno University of Technology, Brno, Czech Republic
- J. G. Švec** Department of Biophysics, Faculty of Science, Palacky University Olomouc, Olomouc, Czech Republic
- J. Szrek** Wroclaw University of Technology, Wroclaw, Poland
- R. Takahashi** Suncall Engineering Corporation, Kyoto, Japan
- H. Terada** University of Yamanashi, Yamanashi, Japan
- E. Thöndel** Czech Technical University in Prague, Prague, Czech Republic
- S. Toyama** Tokyo University of Agriculture and Technology, Tokyo Noko Daigaku, 3-8-1 Harumi-cho, Fuchu-shi, Tokyo 183-8538, Japan
- W. Twaróg** Wroclaw University of Technology, Wroclaw, Poland
- V. Vacarescu** University Politehnica of Timisoara, Timisoara, Romania
- M. Václavík** VÚTS, a.s., Liberec, Czech Republic
- J. Valtera** Technical University of Liberec, Liberec, Czech Republic
- M. Vaško** Žilinská University, Žilina, Slovakia
- D. Vejrych** Technical University of Liberec, Liberec, Czech Republic
- J. E. Vinney** Bournemouth University, Bournemouth, UK
- V. Vlček** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic
- Z. Volanský** VÚTS, a.s., Liberec, Czech Republic
- J. Vondřich** Czech Technical University in Prague, Prague, Czech Republic
- R. Vrzala** Technical University of Liberec, Liberec, Czech Republic
- S. Wudarczyk** Wroclaw University of Technology, Wroclaw, Poland
- E.S. Zăbavă** Politehnica University of Timisoara, Timisoara, Romania
- P. Žabka** Technical University of Liberec, Liberec, Czech Republic
- J. Žák** VÚTS, a.s., Liberec, Czech Republic
- J. Zapoměl** VŠB-Technical University of Ostrava, Ostrava, Czech Republic
- S. Zawislak** University of Bielsko-Biala, Bielsko-Biala, Poland
- Y. Zhu** Graduate School of Medical and Engineering Science, University of Yamanashi, Tokyo, Japan
- I. Zolotarev** Institute of Thermomechanics ASCR, v.v.i., Prague, Czech Republic