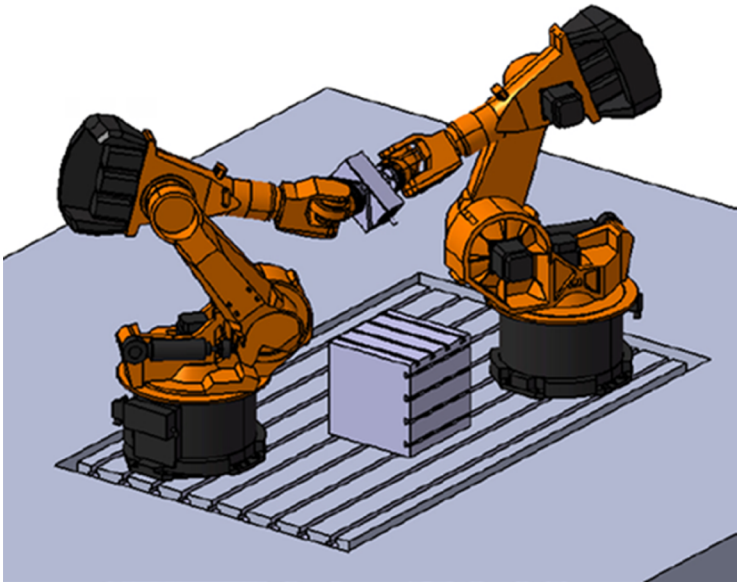
Final Programme

ECCOMAS Thematic Conference on

MULTIBODY DYNAMICS

Prague, June 19 - 22, 2017



CZECH TECHNICAL UNIVERSITY IN PRAGUE
Faculty of Mechanical Engineering

CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE

ECCOMAS

PROGRAMME

Sunday	June 18, 2017
18:00–20:00	Registration

Monday	June 19, 2017		
	Room 256	Room 266	Room 366
8:00–9:30	Registration		
9:30–10:35	Opening session Keynote 1		
10:35–11:00	Coffee break		
11:00–12:40	ROBO-1	FORNM-1	VEHDYN-1
12:40–14:00	Lunch		
14:00–16:00	MULT-1	EFFRT-1	VEHDYN-2
16:00–16:20	Coffee break		
16:20–18:00	ROBO-2	FORNM-2	VEHDYN-3

18:30–21:00	Welcome Reception

Tuesday	June 20, 2017				
	Room 256	Room 266	Room 366	Room 334	Room 337
8:00–8:30	Registration				
8:30–9:30		PARA	FORNM-3	SOFT	BENCH
9:40–10:20	Keynote 2				
10:20–10:40	Coffee break				
10:40–12:40		ROBO-3	FLEX-1	MULT-2	VEHDYN-4
12:40–14:00	Lunch				
14:00–15:00		ROBO-4	FLEX-2	CODY-1	VEHDYN-5
15:00–15:20	Coffee break				
15:20–16:20		EFFRT-2	FLEX-3	CODY-2	

17:30–20:00	Prague Sightseeing Tour
20:00	Dinner in pub U Fleků

Wednesday	**June 21, 2017**				
	Room 256	Room 266	Room 366	Room 334	Room 337
8:00–8:30	Registration				
8:30–9:30		CODY-3	BIO-1	COOP-1	FLEX-4
9:40–10:20	Keynote 3				
10:20–10:40	Coffee break				
10:40–12:40		CODY-4	BIO-2	COOP-2	FLEX-5
12:40–14:00	Lunch				
14:00–15:00		CODY-5	BIO-3	COOP-3	FLEX-6
15:00–15:20	Coffee break				
15:20–16:20		CODY-6	BIO-4		

17:30–18:00	Transfer to Troja Chateau
18:00–20:00	Banquet
20:30–22:30	Boat Trip

Thursday	**June 22, 2017**		
	Room 256	Room 266	Room 366
8:00–8:30	Registration		
8:30–9:30	AERO-1	FORNM-4	BIO-5
9:40–10:20	Keynote 4		
10:20–10:40	Coffee break		
10:40–11:40	AERO-2	FORNM-5	BIO-6
11:45–12:15	Conference Closing		
12:15–14:00	Lunch		

Welcome to the Conference

The ECCOMAS Thematic Conference on Multibody Dynamics is an international meeting held once every two years in a European country. The past conferences have been organized in Lisbon (2003), Madrid (2005), Milan (2007), Warsaw (2009), Brussels (2011), Zagreb (2013) and Barcelona (2015). The last predecessor of this conference that was held at Czech Technical University in Prague in 1994 was the Euromech Colloquium 320 on Multibody systems - Advanced Algorithms and Software Tools.

As the conference chair I cordially welcome you the Multibody Dynamics Conference held at Czech Technical University in Prague.

Conference Objectives

Current conference on multibody dynamics takes place in Prague again after 23 years and will serve as a meeting point for the international researchers, scientists and experts from academia, research laboratories and industry working in the area of multibody dynamics.

Applications are related to many fields of contemporary engineering, from road and railway vehicles, aerospace, through robotic manipulators, machine tools, mechatronic systems, smart structures to biomechanical systems and nanotechnology. The theory and methods of multibody dynamics are also further developed.

Conference Focus

However, as the conference chair I have raised a special attention on two topics in this conference that is visible in the choice of keynote lectures. One topic is the discussion on current problems and challenges in general multibody dynamics formalisms including the treatment of flexible multibody systems (Keynote lectures of Prof. Jorge Ambrosio and Prof. Peter Eberhard). The other topic is the advances in concepts, modelling and control of robots (Keynote lectures of Prof. Andreas Müller and Prof. Andreas Pott). I personally suppose these topics are very important and strongly developing with less attention than they deserve. The topic of robots is specially related to Prague where Karel Čapek wrote his theatre drama R.U.R. (Rossum's Universal Robots) and invented the word "robot".

Michael Valášek, Conference Chair

Conference Topics

The Conference focuses on all aspects of multibody dynamics. Papers are especially solicited on the following topics:

Formulations and Numerical Methods
Efficient Methods and Real-Time Applications
Parallelization methods
Flexible Multibody Dynamics
Contact Dynamics and Constraints
Multiphysics and Coupled Problems
Benchmark Problems
Control and Optimization
Software Development and Computer Technology
Robotics
Road Vehicle Dynamics
Railroad Vehicle Dynamics
Biomechanics
Aerospace and Maritime Applications
Machine Tools

Organizing Committee

Michael Valášek, Conference Chair (Czech Technical University in Prague)

Zbyněk Šika (Czech Technical University in Prague)
Pavel Polach (University of West Bohemia)
Michal Hajžman (University of West Bohemia)
Petr Beneš (Czech Technical University in Prague)
Jan Zavřel (Czech Technical University in Prague)
Zdeněk Neusser (Czech Technical University in Prague)
Tomáš Prajs (Czech Technical University in Prague)
Terézia Němcová, Secretary (Czech Technical University in Prague)

Scientific Committee

Jorge Ambrósio (Instituto Superior Técnico, Portugal)
Kurt Anderson (Rensselaer Polytechnic Institute, USA)
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Olivier A. Bauchau (UM-SJTU Joint Institute, China)
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Carlo L. Bottasso (Politecnico di Milano, Italy)
Olivier Brüls (Univ. of Liège, Belgium)
Alberto Cardona (Univ. Nacional del Litoral, Argentina)
Javier Cuadrado (Univ. de La Coruna, Spain)
Peter Eberhard (Univ. of Stuttgart, Germany)
Paul Fisette (Univ. Catholique de Louvain, Belgium)
Javier García de Jalón (Univ. Politécnica de Madrid, Spain)
Juan Carlos García Orden (Univ. Politécnica de Madrid, Spain)
Johannes Gerstmayr (Univ. of Innsbruck, Austria)
Michal Hajžman (University of West Bohemia, Czech Republic)
Ben Jonker (Univ. of Twente, The Netherlands)
Andrés Kecskeméthy (Univ. of Duisburg-Essen, Germany)
Jozsef Kövecses (McGill Univ., Canada)
Dirk Lefeber (Vrije Univ. Brussel, Belgium)
Andreas Müller (Johannes Kepler University Linz, Austria)
Dan Negrut (Univ. of Wisconsin-Madison, USA)
Ettore Pennestrì (Univ. of Rome, Italy)
Friedrich Pfeiffer (TU München, Germany)
Dmitry Pogorelov (Bryansk State Technical Univ, Russia)
Pavel Polach (University of West Bohemia, Czech Republic)
Werner Schiehlen (Univ. of Stuttgart, Germany)
Arend Schwab (TU Delft, The Netherlands)
Ahmed Shabana (Univ. of Illinois at Chicago, USA)
Nobuyuki Shimizu (Iwaki Meisei Univ., Japan)
Yoshihiro Suda (Univ. of Tokyo, Japan)
Zbyněk Šika (Czech Tech. Univ. in Prague, Czech Republic)
Yoshiaki Terumichi (Sophia Univ., Japan)
Michael Valásek (Czech Tech. Univ. in Prague, Czech Republic)
Tomáš Vampola (Czech Tech. Univ. in Prague, Czech Republic)
Olivier Verlinden (Univ. Mons, Belgium)
Wan-Suk Yoo (Pusan National Univ., Korea)
Evtim Zahariev (Bulgarian Academy of Sciences, Bulgaria)

Keynote Lectures

Jorge A. C. Ambrósio

Multibody Dynamics Formalisms for Multidisciplinary Applications: Current Problems and Challenges

The keynote deals with the current problems and challenges in general multibody dynamics formalisms as a view on the developed approaches and their possible future advanced development.

Peter Eberhard

Simulation and Analysis of the Dynamical-optical Sensitivity of Telescopes by means of Flexible Multibody Systems

The keynote deals with way and efficiency of modelling of flexible multibody systems.

Andreas Müller

Current Control Approaches to Robotics

The keynote deals with control of robots as the basis of robotics in the dialogue between multibody models and control laws of robots.

Andreas Pott

Cable-driven Parallel Robots

The keynote deals with new concepts of robots based on cable actuations. The problems and advantages are discussed.

Conference Information

Conference Venue

The conference will take place in the campus of Czech Technical University (CTU), in the building of Faculty of Mechanical Engineering located in Dejvice Prague quarter (street Technická 4, GPS N 50°6.19100', E 14°23.48700'). The scientific part of the conference is scheduled to take pace in two rooms in the second floor (numbers 256 and 266) and three rooms in the third floor (numbers 334, 337 and 366). The venue is easy accessible by foot from almost all proposed conference hotels. In other cases the best option is to use metro (A- Green Line) from the city center.

Czech Technical University

The Czech Technical University in Prague is one of the biggest and the oldest technical universities in Europe. It was founded on the initiative of Josef Christian Willenberg on the basis of a decree issued on January 18th, 1707 by Emperor Josef I.

CTU currently has eight faculties (Civil Engineering, Mechanical Engineering, Electrical Engineering, Nuclear Science and Physical Engineering, Architecture, Transportation Sciences, Biomedical Engineering, Information Technology) and about 21,000 students.

Faculty of Mechanical Engineering

The FME, the oldest mechanical engineering faculty in the Czech Republic, is a constituent of the Czech Technical University in Prague (CTU). The FME is a direct descendant of the Engineering School in Prague, the first of its type in Central Europe, established in 1707. In the academic year 1863/1864 the former Engineering School in Prague (in 1806 transformed into the Prague Polytechnic) was definitely transformed into a technical university headed by a rector. 1864 is therefore considered as the year of the establishment of the Faculty of Mechanical Engineering.

The CTU in Prague was ranked number one among technical universities in Czech Republicin the QS–World University Rankings, one of the most trusted university ranking in the world.

Registration and Secretariat Desk

The conference registration will start on Sunday, June 18, from 18:00 to 20:00 in the conference venue (Technická 4, Prague 6, Dejvice). The secretariat desk will be located on the left side after entering the building. On Monday, June 19, the registration will be open from 8:00. The desk will be operative during the whole conference since 8.00 to 16.00.

Lunches

Lunches are included in the conference fee and will be served each conference day on the fourth/fifth floor.

Proceedings

Proceedings will be published online on the conference website [www.multibody2017.cz].

Internet

Wireless Internet access will be available during the conference. The participants can use two options to connect to the wireless network:

- Use your "**eduroam**" wireless account based on your institution.
- Connect to network "**fsguest**" with login "**multibody**" and password "**2017**".

General Information

Prague

The conference is organized in Prague, the capital of the Czech Republic. Prague has been a political, cultural, and economic center of central Europe It was founded during the Romanesque and flourishing by the Gothic, Renaissance and Baroque eras, Prague was the capital of the kingdom of Bohemia and the main residence of several Holy Roman Emperors, most notably of Charles IV (1346–1378). You can find here a number of famous cultural attractions, many of which survived the violence and destruction of 20th-century Europe. Main attractions include the Prague Castle, the Charles Bridge, Old Town Square with the Prague astronomical clock, the Jewish Quarter, Petřín hill and Vyšehrad. Since 1992, the extensive historic centre of Prague has been included in the UNESCO list of World Heritage Sites.

Public Transport

The public transport infrastructure consists of an integrated transport system of Prague Metro (lines A, B, and C), tram system, buses, funiculars, and six ferries. All services have a common ticketing system, and are run by the Prague Public Transport Company.Passengers must buy and validate a ticket before entering a station's paid area (single ticket for 90 minutes costs 32 CZK).Short-term tourist passes are available for periods of 24 hours (110 CZK) and 3 days (310 CZK). Tickets could be purchased in vending machines or in special shops. You can also ask at the reception of your hotel.

Currency

Czech currency is called Czech crown (CZK), "koruna" or "Kč" in Czech. You can easily change all main currencies to CZK in exchange offices but be aware of bad rates or too high charge fees, which are common tourist scams in Prague. The official rate could be between 26 to 27 CZK for 1 EUR and 23 to 24 CZK for 1 USD. Almost all shops and restaurants in Prague are accepting payments in EUR. We recommend to use your debit or credit cards instead of payment in cash.

Conference Programme

Monday - June 19, 2017 **9:00–10:35**

Monday - June 19, 2017 **9:00–10:35** **Opening + Keynote 1**
Chair: Michael Valášek

Room 256

Opening ceremony

Multibody Dynamics Formalisms for Multidisciplinary Applications: Current Problems and Challenges
Jorge Ambrosio

Monday - June 19, 2017 **11:00–12:40**

Monday - June 19, 2017 **11:00–12:40** **ROBO-1**
Chair: Javier Ros **Robotics 1**

Room 256

Cable Driven Spherical Mechanism Quadrosphere Enhanced by 3 DOF Piezo-actuated Platform
Zbyněk Šika, Petr Beneš, Michael Valášek, Jiří Volech, Karel Kraus, Radek Bulín, Michal Hajžman, Pavel Polach

On the Use of Principal Vectors in Multibody Dynamics
Volkert van der Wijk

Robust Rest-to-Rest Motion Planning for Cranes Through a Variational Solution
Paolo Boscariol, Dario Richiedei

Comparison of Distributed Model Predictive Control Approaches for Transporting a Load by a Formation of Mobile Robots
Henrik Ebel, Ehsan Sharafian Ardakani, Peter Eberhard

Performance of a Quasi-Holonomic Mobile Robotic Carrier in the Dynamics Mimicking System
Avi Weiss, Uri Ben Hanan

Monday - June 19, 2017 **11:00–12:40** **FORNM-1**
Chair: Olivier Bruls **Formulations and Numerical Methods 1**

Room 266

A Simple Energy-Conserving Torsion-Free Beam Element for Multibody Applications
Juan Carlos García Orden

Adjoint sensitivity analysis of three-dimensional beam formulation
Alfonso Callejo, Olivier A. Bauchau

Convergence Rate Improvement in The HHT Integration Method for Index-3 DAEs of Multibody Dynamics
Naresh Khude, Mike Collingridge, Jose Ortiz, Ashraf Hamed

Multibody Kinematics by Means of Dual Constraints
Ettore Pennestri', Pier Paolo Valentini

Locally Nonlinear Strategies and Effective Preconditioners for Domain Decomposition Methods Applied to Large Flexible Multibody Systems
Eva-Maria Dewes, Daniel Rixen

Monday - June 19, 2017 **11:00–12:40** **VEHDYN-1**
Chair: Wan-Suk Yoo **Rail-Road Vehicle Dynamics 1**

Room 366

A Soft Soil Contact Model with Adaptive Level of Detail for Predicting Off-Road Vehicle Mobility
Alessandro Tasora, Dario Mangoni, Dan Negrut, Radu Serban, Paramsothy Jayakumar

Force Estimation on a McPherson Suspension by Means of a State Estimator and a Multibody Model
Enrico Risaliti, Martijn Vermaut, Jan Croes, Bram Cornelis, Wim Desmet

Optimal Control of the Tilting Modes Transition for a Narrow Track Vehicle through MBS Modelling
Quentin Docquier, Timothée Habra, Nicolas Docquier, Paul Fisette

A Knife-Edge Wheel-Rail Contact Constraint Approach for the Multibody Simulation of Railway Vehicles
José L. Escalona, Pedro Urda, Sergio Muñoz, Javier F. Aceituno, Daniel García-Vallejo, Rosario Chamorro

Development of an Innovative Degraded Adhesion Model for Railway Multibody Applications
Enrico Boccini, Elisa Butini, Lorenzo Marini, Martina Meacci, Enrico Meli, Andrea Rindi

Monday - June 19, 2017 **14:00–16:00**

Monday - June 19, 2017 **14:00–16:00** **MULT-1**
Chair: Eduardo Paiva Okabe **Multiphysics and Coupled Problems 1**

Room 256

Dynamic Simulation of the Inflation Gas of a Tire Under Operational Conditions
Axel Gallrein, Manfred Baecker, Francesco Calabrese

Coupling a DEM Material Model to Multibody Construction Equipment
Michael Burger, Klaus Dreßler, Torbjörn Ekevid, Stefan Steidel, Dietmar Weber

A Unitary Framework for Handling Fluid-Solid Interaction (FSI) Problems
Dan Negrut, Hammad Mazhar, Milad Rakhsha, Arman Pazouki

An Efficient and Robust Standard Particle Interface for Multi-Flexible-Body Dynamics
Juhwan Choi, Jin Hwan Choi

Coupled Model for Simulating Turbocharger Rotors with Ball Bearings
Daixing Lu, Ioannis Chatzisavvas, Robert Schmoll, Bernhard Schweizer

Multibody Formulation of a Load-out Problem of a Mega Block Using Modular Transporters in Shipbuilding Industry
Seung-Ho Ham, Myung-Il Roh

Monday - June 19, 2017 **14:00–16:00** **EFFRT-1**
Chair: Joachim Linn **Efficient Methods and Real-Time Applications 1**

Room 266

Real-Time Estimation based on Multibody Dynamics for Automotive Embedded Heterogeneous Computing
Antonio Joaquin Rodriguez Gonzalez, Roland Pastorino, Miguel Ángel Naya Villaverde, Emilio Sanjurjo Maroño, Wim Desmet

Index-3 Divide And Conquer Algorithm For Efficient Multibody Dynamics Simulations
Pawel Malczyk, Janusz Frączek, Francisco González, Javier Cuadrado

In-Extensible ANCF Cable Element for Real-Time Simulations
Grzegorz Orzechowski, Aki M. Mikkola

Study on Model Order Reduction of Flexible Multibody Systems
Kai Luo, Cheng Liu, Qiang Tian, Haiyan Hu

Constraint Reordering for Iterative Multi-Body Simulation with Contact
Sheldon Andrews, Kenny Erleben, Paul G. Kry, Marek Teichmann

Dynamic Relaxation Method to Determine Equilibrium Configuration of Dynamic Models
Samuel Jung, Tae-Yun Kim, Seul-Gi Yoon, Wan-Suk Yoo

Monday - June 19, 2017 **14:00–16:00** **VEHDYN-2**
Chair: Alexander Passer **Rail-Road Vehicle Dynamics 2**

Room 366

Development of an Innovative Model to Study Wear Evolution Considering Wheel-Rail Conformal Contact
Elisa Butini, Lorenzo Marini, Martina Meacci, Enrico Meli, Andrea Rindi

Motorway Sharing for Passenger Cars and Truck Platoons
Werner Schiehlen

Assessment of the Necessary Width of a Bicycle Lane by Means of Multibody Simulations on a Bicycle-Rider System
Arend L. Schwab, J. P. Meijaard

Inerter Potential for Vehicle Vertical Dynamics
Pavel Steinbauer, Jan Banecek, Ondrej Kolda, Pavel Houfek, Tomas Zemanek

Evaluation Criterion of Force Transfer through Mechanism
Michael Valášek, Jan Vích

Estimation of Railroad Vehicle Dynamics and Track Irregularities Using Data Fusion Techniques and Computational Methods
Javier F. Aceituno, Pedro Urda, Rosario Chamorro, Sergio Muñoz, Daniel García-Vallejo, José L. Escalona

Monday - June 19, 2017 **16:20–18:00**

Monday - June 19, 2017 **16:20–18:00** **ROBO-2**
Chair: Jozsef Kovecses **Robotics 2**

Room 256

Increase of Stiffness in Physically Cooperating Robots
Michael Valášek, Martin Nečas, Ladislav Mráz

Kinematic Design of a Multiple Motion-type Parallel Manipulator based on the 3-RRS Mechanism
Weidong YU, Hao WANG, Genliang CHEN, Longhai ZHAO

On Optimal Laws of Groups of Walking Robots Motion while Solving Formation Task
Eugene Samuilovich Briskin, Alexander Vasilievich Maloletov

Modelling and Control Synthesis of Flexible Robot Arm Equipped with Additional Sensors
Jiří Volech, Zbyněk Šika, Petr Beneš, Michael Valášek

Monday - June 19, 2017 **16:20–18:00** **FORNM-2**
Chair: Alessandro Cammarata **Formulations and Numerical Methods 2**

Room 266

Interpolation Schemes for Geometrically Exact Beams: A Motion Approach
Valentin Sonneville, Olivier Bruls, Olivier A. Bauchau

Computer Simulation of the Inverse Dynamics of Underactuated Mechanical Systems
Yinping Yang, Peter Betsch

On the Proper Orthogonal Decomposition for the reduced-order modelling of geometrically nonlinear elastic bodies
Olivier Bruls, Vladimir Martinusi, Valentin Sonneville

Velocity-Based Three-Dimensional Beam Using the Energy Preserving Approach
Eva Zupan, Dejan Zupan

Nullspace Method for the Analysis of Uniqueness of Reactions and Driving Forces in Redundantly Constrained Multibody Systems
Marcin Pękal, Janusz Frączek, Marek Wojtyra

Monday - June 19, 2017 **16:20–18:00** **VEHDYN-3**
Chair: Hiroyuki Sugiyama **Rail-Road Vehicle Dynamics 3**

Room 366

Numerical Investigation on the Dynamics of a High-Performance Motorcycle Equipped With an Innovative Hydro-Pneumatic Suspension System
Alberto Martini, Gabriele Bellani

An overview of a Connected Autonomous Vehicle Emulator
Asher Elmquist, Dylan Hatch, Radu Serban, Dan Negrut

A Variable Time-Step and Variable Penalty Method for the Index-3 Augmented Lagrangian Formulation with Velocity and Acceleration Projections
Daniel Dopico, Emilio Sanjurjo, Javier Cuadrado, Alberto Luaces

An Optimal Velocity Profile Design for 6 x 6 Unmanned Ground Vehicle Based on Real-time Traversability(RTT) Analysis
Hyosung Hong, Jongboo Han, Hajun Song, Samuel Jung, Sung-Soo Kim, Mooncheol Won, Wan Suk Yoo, Sanghyun Joo

Monday - June 19, 2017 **18:30–21:00**

Monday - June 19, 2017 **18:30–21:00**

Welcome Reception

Tuesday - June 20, 2017 **8:30–9:30**

Tuesday - June 20, 2017 **8:30–9:30** **PARA**
Chair: Radu Serban, Michael Valášek **Paralelization methods**

Room 266

Elimination Method for Parallelization of Flexible Multibody System Dynamics
Michael Valášek, Ladislav Mráz

A Co-Simulation Framework for High-Fidelity Simulation of Vehicle-Terrain Interaction
Radu Serban, Antonio Recuero, Nicholas Olsen, Dan Negrut

On-line Estimation of Wheel-Rail Contact Forces through Efficient Real-Time Models
José Escalona, Emanuele Galardi, Lorenzo Marini, Enrico Meli, Andrea Rindi, Benedetta Romani

Tuesday - June 20, 2017 **8:30–9:30** **FORNM-3**
Chair: Martin Arnold **Formulations and Numerical Methods 3**

Room 366

Experimental Investigation and Numerical Modeling of Resultant-based Bending Plasticity in Cables
Vanessa Dörlich, Peter Češarek, Joachim Linn, Stefan Diebels

Application of a DAE Approach to Nonlinear Sloshing Problems
Kensuke Hara

Dynamic Analysis of Thin Cables with Time-Varying Unwinding Velocity Condition and Transient-Tension Equations
Ji-Heon Kang, Jin-Seok Jang, Kum-Woo Kim, Jae-Wook Lee, Hyung-Ryul Kim, Seung-Hyun Jeong, Joo-Young Oh, Wan-Suk Yoo

Tuesday - June 20, 2017 **8:30–9:30** **SOFT**
Chair: Zdenek Neusser **Software Development and Computer Technology**

Room 334

Multibody System Dynamics at the University of Minho: Teaching and Research Activities
Paulo Flores

Synchronous Machine Electromechanical and Mechanical Analogy Model Comparison
Michael Valášek, Martin Nečas, Zdeněk Neusser, Jan Pelikán, Petr Neuman

Inverse Dynamics Toolbox for Multibody System Simulations
Karin Nachbagauer, Thomas Lauß, Stefan Oberpeilsteiner, Wolfgang Steiner

Tuesday - June 20, 2017 **8:30–9:30** **BENCH**
Chair: Javier Cuadrado **Benchmark Problems**

Room 337

Comparison of Classical Multibody Simulation Methods with regard to the DAE Mathematica Solver
Remi Barrere, Benjamin Boudon

Benchmark Problems for the Linearization of Multibody Dynamics
Francisco González, Bruce Minaker, Pierangelo Masarati, Alberto Luaces, David Vilela, Javier Cuadrado

Computational Modelling of the Parallel Cable Mechanism with the Added Active Structure
Radek Bulín, Michal Hajžman, Pavel Polach, Zbyněk Šika, Jan Zavřel

Tuesday - June 20, 2017 **9:40–10:20**

Tuesday - June 20, 2017 **9:40–10:20** **Keynote 2**
Chair: Olivier A. Bauchau

Room 256

Current Control Approaches to Robotics
Andreas Mueller

Tuesday - June 20, 2017 **10:40–12:40**

Tuesday - June 20, 2017 **10:40–12:40** **ROBO-3**
Chair: Zbyněk Šika **Robotics 3**

Room 266

Development of Structure and Behavioral Model for Screw Driving In-pipe Inspection Robot based on Adaptive Mechanism on Legs
Krešimir Osman, Zdenko Kovačić

Adaptive Learning Control Algorithms for KUKA LWR 4+ Robots
Łukasz Woliński

Proportional-Derivative and Model-Based Controllers Used for a Serial Type Manipulator in Case of a Variable Mass Payload
Krzysztof Lipinski

Optimal Point to Point Trajectory Planning with Collision Avoidance for Dual Arm Setup
Dominik Kaserer, Hubert Gattringer, Andreas Müller

Coordinate-Free Decomposition of the Rrigid Body Displacement: A Davenport Dual Angles Approach
Daniel Condurache

Selected Feedback Control Concepts in End-effector Trajectory Tracking of a Highly Flexible Manipulator
Merlin Morlock, Robert Seifried

Tuesday - June 20, 2017 **10:40–12:40** **FLEX-1**
Chair: Myung-Il Roh **Flexible Multibody Dynamics 1**

Room 366

Implementation of Shear Deformable Thin-Walled Beam Element for Flexible Multibody Dynamics
Ben Jonker

Kinetic Aspects of Discrete Cosserat Rods
Joachim Linn, Tomas Hermansson, Fredrik Andersson, Fabio Schneider

Some Considerations on the Setup of Pseudo-Rigid Body Models for Single-Leaf Flexure Hinges in Compliant Mechanisms
Pier Paolo Valentini, Ettore Pennestrì

The Use of Modal Derivatives in Determining Stroke-Dependent Frequencies of Large Stroke Flexure Hinges
Mieke van den Belt, Jurnan Schilder

FLEGX: Multibody Approach in Flexible Structure Design and Control
Mariapaola D'Imperio, Daniele Ludovico, Cristiano Pizzamiglio, Lando Mentrasti, Darwin G. Caldwell, Ferdinando Cannella

Approach for Modeling Flexible Bodies based on Experimental Data with Utilization in Elastic Multibody Simulation
Claudius Lein, Johannes Woller, Helge Hopf, Michael Beitelschmidt

Tuesday - June 20, 2017 **10:40–12:40** **MULT-2**
Chair: Juan Carlos García Orden **Multiphysics and Coupled Problems 2**

Room 334

Damping Effect on Tall Building Low Frequency Vibration Using Two-Degree-of-Freedom Enhanced Coriolis Effect Damper
Mario Patrick Walker, Masaaki Okuma, Yuuki Hira

A Study on the Steering Jerk of a Wheel Loader Using MBD Simulation Including Hydraulic System
Heejong Lee, Jimin Lee, Minseok Kim, Wansuk Yoo

Investigation of Numerical Stability and Local Error for Continuous Co-Simulation Methods
Martin Busch

Dynamic Analysis of a 3D Printer Based on the Delta Mechanism
Eduardo Paiva Okabe, Pierangelo Masarati

Advance Modeling of Machine Tool Machining Process
Frederic Cugnon, Luke Berglind, Denys Plakhotnik, Erdem Ozturk

Tuesday - June 20, 2017 **10:40–12:40** **VEHDYN-4**
Chair: Pavel Polach **Rail-Road Vehicle Dynamics 4**

Room 337

Physics-Based Tire-Soil Interaction Model and Validation for Off-Road Mobility Simulations
Hiroki Yamashita, Paramsothy Jayakumar, Mustafa Alsaleh, Hiroyuki Sugiyama

Experimental Model of a Vehicle with an Assistant for Reversing with a Trailer
Jan Zavřel, Petr Beneš, Ladislav Vrbský, Petr Denk

Development of Steering Torque Simulator with Multibody Kinematic Model Considering Friction Characteristics of Steering Gear
Tadashi Iwasaki, Hiroki Hoshino, Taichi Shiiba

Estimation of Commercial Vehicle Dynamics by Means of Real-Time Application in Condition of High Speed Curvilinear Maneuvers
Anton Tumasov, Danila Butin, Alexey Vasiliev, Viktor Kryaskov

Linearized Modal Analysis of Vehicle Powertrains
Josef Haslinger, Guenter Offner, Martin Sopouch, Bianka Zinkiewicz

Behavior of Drivers with Road Departure Prevention Systems Using Driving Simulator
Seongchae Park, seungjun Choi, Daegyu Kim, Donguk Kim, Shengpeng Zhang, Taeoh Tak

Tuesday - June 20, 2017 **14:00–15:00**

Tuesday - June 20, 2017 **14:00–15:00** **ROBO-4**
Chair: Andreas Mueller **Robotics 4**

Room 266

Forward Kinematics Analysis of a Stewart Platform using Computer Vision Pose Estimation
Mohd Zubair, Vineet Mathew, Sudipto Mukherjee, Deepak K Gupta

Improved Calibration of Machine Tools by Redundant Measurement
Michael Valášek, Filip Kovář

Tuesday - June 20, 2017 **14:00–15:00** **FLEX-2**
Chair: Olivier Verlinden **Flexible Multibody Dynamics 2**

Room 366

Parallel Implementation of Flexible Multibody Dynamics Simulation Based on the Motion Formalism
Valentin Sonneville, Olivier A. Bauchau

A Discrete Hamilton-Pontryagin Approach to the Statics of Kirchhoff Rods
Alejandro Blumentals, Florence Bertails-Descoubes

Dynamics of Spatial Flexible Multibody Systems with Interval Probabilities
Zhe Wang, Qiang Tian, Haiyan Hu

Tuesday - June 20, 2017 **14:00–15:00** **CODY-1**
Chair: Ben Jonker **Contact Dynamics and Constraints 1**

Room 334

Mathematical Tools for the Analysis of Smooth and Non-Smooth Systems with Redundant Constraints
Martin Arnold, Manuela Paschkowski

Selection and Experimental Validation of Contact / Impact Models Suitable for Multibody Dynamics Simulations
Krystof Peter Jankowski, M. S. Chaudhry, Alex Czekanski

Efficient Evaluation of Local and Global Deformations in Impact Simulations in Reduced Flexible Multibody Systems based on a Quasi-Static Contact Submodel
Stephan Tschigg, Robert Seifried

Tuesday - June 20, 2017 **14:00–15:00** **VEHDYN-5**
Chair: Mooncheol Won **Rail-Road Vehicle Dynamics 5**

Room 337

Cable Dynamics and Fatigue Analysis for Digital Mock-Up in Vehicle Industry
Fabio Schneider, Joachim Linn, Tomas Hermansson, Fredrik Andersson

Use of Joint Coordinates and Homogenous Transformations for Modelling of Articulated Vehicle Dynamics
Iwona Adamiec-Wójcik, Łukasz Drąg, Stanisław Wojciech

Tilting Child Safety Seat for Reducing the Lateral Acceleration Acting on Children when Vehicle Cornering
Nikolay Lyubenov Pavlov, Evgeni Evgeniev Sokolov

Tuesday - June 20, 2017 **15:20–16:20**

Tuesday - June 20, 2017 **15:20–16:20** **EFFRT-2**
Chair: Pawel Malczyk **Efficient Methods and Real-Time Applications 2**

Room 266

Simplification of Multibody Direct Dynamics Models by Parameter Elimination
Javier Ros, Aitor Plaza, Xabier Iriarte

Comparative Analysis about High DOF Model and Low DOF Model of Rescue Robot
Tae-Yun Kim, Samuel Jung, Wan-Suk Yoo

Performance Aspects of Real-Time Capable Flexible Multibody Simulations
Alexander Schmitt, Robert Seifried

Tuesday - June 20, 2017 **15:20–16:20** **FLEX-3**
Chair: Alberto Cardona **Flexible Multibody Dynamics 3**

Room 366

Kinematic Calibration of a Six DOF Flexure-Based Parallel Manipulator
Axel J.H. Timmer Arends, Kevin H.J. Voss, Wouter B.J. Hakvoort, Ronald G.K.M. Aarts

Avoiding Unphysical Vibrations Caused by Statically Correct Reduction of Elastic Multibody Systems
Pascal Ziegler, Peter Eberhard

Comparison of Local and Global Approaches for Parametric Model Order Reduction for Systems with Distributed Moving Loads
Benjamin Fröhlich, Peter Eberhard

Tuesday - June 20, 2017 **15:20–16:20** **CODY-2**
Chair: Ettore Pennestri' **Contact Dynamics and Constraints 2**

Room 334

On the Generalized Friction Cone for Multibody Systems
Albert Peiret, Jozsef Kovecses, Josep M. Font-Llagunes

A Discussion of Two Approaches for Studying the Dynamics of Dry Granular Material
Michal Kwarta, Arman Pazouki, Radu Serban, Dan Negrut

Tuesday - June 20, 2017 **17:30–23:00**

Tuesday - June 20, 2017 **17:30–22:00**

17:30–20:00	**Prague Sightseeing Tour**
20:00–23:00	**Dinner in pub U Fleků**

Wednesday - June 21, 2017 **8:30–9:30**

Wednesday - June 21, 2017 **8:30–9:30** **CODY-3**
Chair: Alan Paul Bowling **Contact Dynamics and Constraints 3**

Room 266

A Spatial Revolute Joint Model with Clearance in Mechanisms Dynamics
Federico Cavalieri, Alberto Cardona, Olivier Bruls, Javier Galvez

Geometrical Interpretation of LCP Pivoting in Contact Dynamics
Andreas Enzenhöfer, Marek Teichmann, József Kövecses

Geometric Non-Linear Dynamics of Shell System with Large Amount of Contact Based on the Co-Rotational Formulation
Jiabei Shi, Zhuyong Liu, Jiazhen Hong

Wednesday - June 21, 2017 **8:30–9:30** **BIO-1**
Chair: Maxime Raison **Biomechanics 1**

Room 366

Using Kinematic Rolling Surfaces for Fast Foot-Ground Modeling in the Forward Dynamics of Human Gait - A Sagittal Plane Analysis
Lennart Caspers, Mario Siebler, Harald Hefter, Urbano Lugris, Andres Kecskemethy

Quantification of Intervertebral Efforts Using a Multibody Dynamics Approach: Application to Scoliosis
Gabriel Abedrabbo, Olivier Cartiaux, Philippe Mahaudens, Christine Detrembleur, Maryline Mousny, Paul Fisette

Influence of the side branches of the human vocal tract on the voice quality
Tomáš Vampola, Jaromír Horáček

Wednesday - June 21, 2017 **8:30–9:30** **COOP-1**
Chair: Wallace Moreira Bessa **Control and Optimization 1**

Room 334

Fully Coupled Topology Optimization of Flexible Multibody Systems with Constraints
Alexander Held, Thomas Kohlsche, Robert Seifried

Variational Multirate Integration in Discrete Mechanics and Optimal Control
Tobias Gail, Sina Ober-Blöbaum, Sigrid Leyendecker

Forward Sensitivity Analysis of the Index-3 Augmented Lagrangian Formulation with Projections
Daniel Dopico, Francisco Gonzalez, Mariano Saura, Daniel García-Vallejo

Wednesday - June 21, 2017 **8:30–9:30** **FLEX-4**
Chair: Arman Pazouki **Flexible Multibody Dynamics 4**

Room 337

Estimating Relative Eigenvalue Errors of Dynamic Model Reduction for Reliable Flexible Multibody Simulation
Jin-Gyun Kim, Hanmin Lee, Juhwan Choi, Jin Hwan Choi

Calibration of mechatronic flexible joint
Michael Valášek, Vaclav Bauma, Pavel Steinbauer

Modal Testing on Wind Turbines for Validation of a Flexible Multibody Model
János Zierath, Roman Rachholz, Sven-Erik Rosenow, Reik Bockhahn, Andreas Schulze, Christoph Woernle

Wednesday - June 21, 2017 **9:40–10:20**

Wednesday - June 21, 2017 **9:40–10:20** **Keynote 3**
Chair: Jorge Ambrosio

Room 256

Simulation and Analysis of the Dynamical-optical Sensitivity of Telescopes by means of Flexible Multibody Systems
Peter Eberhard, Johannes Störkle

Wednesday - June 21, 2017 **10:40–12:40**

Wednesday - June 21, 2017 **10:40–12:40** **CODY-4**
Chair: Alessandro Tasora **Contact Dynamics and Constraints 4**

Room 266

Comparison of Two Versions of the LuGre Model Under Conditions of Varying Normal Force
Marek Wojtyra

Modeling Rigid Body Multi-point Contact-Impact Transition for Event-Based Simulation Schemes
Abhishek Chatterjee, Alan Paul Bowling

Modelling of the Nuclear Fuel Assembly Components as a Flexible 1D Continua with Inner and Outer Impact Interactions
Štěpán Dyk, Vladimír Zeman

Numerical Prediction and Experimental Validation of a Three-Dimensional Rod-Plate Impact
Jianyao Wang, Zhuyong Liu, Jiazhen Hong

Experimental Investigation of Contact-impact In Multi-body System Using DIC Technique
Peng Chen, Jinyang Liu, Xiaowei Deng

Contact and Constraints in Analytical Dynamics
René Paul Souchet

Wednesday - June 21, 2017 **10:40–12:40** **BIO-2**
Chair: Andres Kecskemethy **Biomechanics 2**

Room 366

Validating Subject Multibody Dynamics Estimated Action with Measured sEMG at Lower Limb Muscles on different Gait modes
Carlos Manuel Barbosa Rodrigues, Miguel Paiva Velhote Correia, João M. C. S. Abrantes

What is sit-to-stand without a chair?
Valerie Norman-Gerum, John McPhee

A Human Mannequin Head-and-Neck Multibody Model for the Simulation of High-Speed Impacts
Francisco González, Urbano Lugrís, Javier Cuadrado, Marcos Rodríguez-Millán, María Henar Miguélez

Multibody Biomechanical Analysis of Taekwondo Athletes
Giovanni Gerardo Muscolo, Darwin Caldwell, Ferdinando Cannella

Modelling of Real Car-to-Pedestrian Accident: Comparison of Various Approaches in the Car Bonnet Modelling
Jan Spicka, Jan Vychytil, Jaroslav Manas, Petr Pavlata

Optimal Control of a Biomechanical Multibody Model for the Dynamic Simulation of Working Tasks
Michael Roller, Staffan Björkenstam, Joachim Linn, Sigrid Leyendecker

Wednesday - June 21, 2017 **10:40–12:40** **COOP-2**
Chair: Robert Seifried **Control and Optimization 2**

Room 334

Position Control of Flexible Chain Using Wave Based Control
Michael Valášek, Filip Šáfr, Zdeněk Neusser, Jan Pelikán

Modelling of Slender Elements in Offshore Engineering Using the Rigid Finite Elements Method
Iwona Adamiec-Wójcik, Łukasz Drąg, Stanisław Wojciech

Active Vibrations Attenuation by Controlling Relative Motion of Selected Masses, FE Modeling
Walerian Szyszkowski, Ehsan Sharbati

On Control of Robot Manipulators with Flexible Joints
Aleksandr Andreev, Olga Peregudova

Cloth-like Structures with Distributed Active Damping
Petr Benes, Zbynek Sika, Martin Hromcik, Radek Krejza

Parameter Identification of a Torsional Vibration Damper in Frequency Domain Using Adjoint Fourier Coefficients
Thomas Lauß, Stefan Oberpeilsteiner, Wolfgang Steiner, Karin Nachbagauer, Stefan Reichl

Wednesday - June 21, 2017 **10:40–12:40** **FLEX-5**
Chair: Michal Hajžman **Flexible Multibody Dynamics 5**

Room 337

A Generalised Fourier Method to Solve the Initial Boundary Value Problem for Free Vibrating Viscoelastic Beam Models
Holger Lang, Sigrid Leyendecker

Research on Form-finding and Deployment Dynamics for Modular Cable-Truss Antenna
Hanjiang Chang, Kai Luo, Qiang Tian, Haiyan Hu

Multibody Dynamics of Gear Pairs: Comparison Among Different Models
Marco Cirelli, Ettore Pennestrì, Pier Paolo Valentini

Comparison of Model Order Reduction Techniques for Flexible Multibody Dynamics using an Equivalent Rigid-Link System Approach
Renato Vidoni, Lorenzo Scalera, Alessandro Gasparetto, Marco Giovagnoni

Modelling and simulation of mechatronic flexible joint
Michael Valášek, Václav Bauma

Wednesday - June 21, 2017 **14:00–15:00**

Wednesday - June 21, 2017 **14:00–15:00** **CODY-5**
Chair: Pier Paolo Valentini **Contact Dynamics and Constraints 5**

Room 266

A 3D Volumetric Foot-Ground Model for Forward Dynamics
Peter Brown, John McPhee

Gear Contact Model: Simulations and Measurement
Zdeněk Neusser, Tomáš Vampola, Michael Valášek, Matěj Sulitka

Multibody Modelling of Friction Based Interaction between Turbine Blades
Olivier Verlinden, Michal Hajzman, Hoai Nam Huynh, Miroslav Byrtus

Wednesday - June 21, 2017 **14:00–15:00** **BIO-3**
Chair: Sigrid Leyendecker **Biomechanics 3**

Room 366

Development of a Tool for the Sensitivity Analysis of Design Parameters of Femoral Implants in the Human Body During Gait
Benjamin Gervais, Aurelian Vadean, Myriam Brochu, Maxime Raison

Dynamic Parameter Identification of an Upper Extremity Rehabilitation Robot Using GPOPS-II
Borna Ghannadi, Reza Sharif Razavian, John McPhee

Optimization Methods for Identifying Muscle Forces in a Spinal-Cord- Injured Subject during Crutch-Assisted Gait
Florian Michaud, Urbano Lugrís, Ye Ou, Javier Cuadrado, Andrés Kecskeméthy

Wednesday - June 21, 2017 **14:00–15:00** **COOP-3**
Chair: Wolfgang Steiner **Control and Optimization 3**

Room 334

Model Based Filtering on the Horizontal Axis Wind Turbine. Towards a Holistic Approach: Load Measurement, Predictive Maintenance, Mechanical Design Assessment and Certification.
Javier Ros, Aitor Plaza, Xabier Iriarte, Gorka Gainza

Design Optimization of Planetary Gear Trains Under Dynamic Constraints and Parameter Uncertainty
Erich Wehrle, Franco Concli, Luca Cortese, Renato Vidoni

Intelligent Sliding Mode Control of an Overhead Container Crane
Wallace Moreira Bessa, Svenja Otto, Edwin Kreuzer, Robert Seifried

Wednesday - June 21, 2017 **14:00–15:00** **FLEX-6**
Chair: Peter Eberhard **Flexible Multibody Dynamics 6**

Room 337

Two Approaches of the Rigid Finite Element Method to Modelling the Flexibility of Spatial Linkage Links
Krzysztof Augustynek, Andrzej Urbaś

Kinematic and Dynamic Behavior of Hyperelastic Plate with External Force via Absolute Nodal Coordinate Formulation
Haidong Yu, Jingjing Luo, Canming Yi, Hao Wang

On the Use of the Absolute Nodal Coordinate Formulation for the Dynamic Analysis of Rotating Shafts
Vesa-Ville Taneli Hurskainen, Marko Kalervo Matikainen, Jia Wang, Aki Matti Mikkola

Wednesday - June 21, 2017 **15:20–16:20**

Wednesday - June 21, 2017 **15:20–16:20** **CODY-6**
Chair: Marek Wojtyra **Contact Dynamics and Constraints 6**

Room 266

Dynamics of Falling Dominoes
Tengfei Shi, Caishan Liu

Multibody Dynamics of a Flexible Legged Robot with Wheeled Feet
Giovanni Gerardo Muscolo, Darwin Caldwell, Ferdinando Cannella

Wednesday - June 21, 2017 **15:20–16:20** **BIO-4**
Chair: Arend L. Schwab **Biomechanics 4**

Room 366

Experimental Identification of Time-Delay of Human Balancing Using Cepstrum
Ambrus ZELEI, Dalma NAGY, Csenge A. MOLNÁR, László BENCSIK, Tamás INSPERGER

Identification of Knee Ligament Properties by Multibody Optimisation
Evelyn Winter, Robert Grawe, Michael Stoltmann, Philipp Bergschmidt, Andreas Geier, Rainer Bader, Christoph Woernle

Use of Analytical Derivatives in an Optimal Control Algorithm for the Residual Elimination Problem of Gait
Francisco Mouzo, Urbano Lugrís, Daniel Dopico, Benjamin Fregly, Javier Cuadrado

Wednesday - June 21, 2017 **17:30–22:30**

Wednesday - June 21, 2017 **18:30–21:00**

17:30–18:00	**Transfer to Troja Chateau**
18:00–20:00	**Banquet**
20:30–22:30	**Boat Trip**

Thursday - June 22, 2017 **8:30–9:30**

Thursday - June 22, 2017 **8:30–9:30** **AERO-1**
Chair: Christoph Woernle **Aerospace and Maritime Applications 1**

Room 256

Equivalent Mass-Spring Models of Multibody Spacecraft for the Application of Wave-based Control
Joseph William Thompson

Forward Dynamics of Fixed-Wing Aircraft with Attitude Reconstruction via Novel Quaternion-Integration Procedure
Zdravko Terze, Dario Zlatar, Viktor Pandža, Milan Vrdoljak

Attitude Control of the Tether Space Mobility Device in Extending and Winding Tether
Yu Uematsu, Shoichiro Takehara, Wataru Miyaji, Yoshiaki Terumichi

Thursday - June 22, 2017 **8:30–9:30** **FORNM-4**
Chair: Dejan Zupan **Formulations and Numerical Methods 4**

Room 266

Condensed Stiffness Matrices for the Model Reduction of Flexible Multibody Systems
Alessandro Cammarata, Rosario Sinatra

Recursive Solution Procedures for Flexible Multibody Systems: Comparing Condensation and Transfer Matrix Methods
Jurnan Schilder, Marcel Ellenbroek, André de Boer

Indirect State and Force Estimator Based on Multibody Models
Emilio Sanjurjo, Miguel Ángel Naya, Daniel Dopico, Antonio Joaquín Rodríguez

Thursday - June 22, 2017 **8:30–9:30** **BIO-5**
Chair: Urbano Lugrís **Biomechanics 5**

Room 366

Human like Motion Generation for Ergonomic Assessment - a Muscle Driven Digital Human Model using Muscle Synergies
Marius Obentheuer, Michael Roller, Staffan Björkenstam, Karsten Berns, Joachim Linn

Periodic Servo-Constraints in a Stick Balancing Problem
Laszlo Bencsik, Zelei Ambrus

Generating Optimal Gaits for the Biped Across Different Locomotion Modes
Lulu Gong, Zhenghai Zhang, Cichen Zhang, Weikang Zeng, Yunpeng Li

Thursday - June 22, 2017 **9:40–10:20**

Thursday - June 22, 2017 **9:40–10:20** **Keynote 4**
Chair: Werner Schiehlen

Room 256

Cable-Driven Parallel Robots
Andreas Pott

Thursday - June 22, 2017 **10:40–12:40**

Thursday - June 22, 2017 **10:40–11:40** **AERO-2**
Chair: Tomáš Vampola **Aerospace and Maritime Applications 2**

Room 256

Deployment of a Coilable Boom Based on Corotational Frame for Flexible 3-D Beams with Large Displacement and Rotation
Zhuyong Liu, Tanhui Wu, Jiazhen Hong

A Study on the Effective Deployment of Tethered System via Fast Analysis Method and Experimental Validation
Yoshiki Sugawara, Shuntarou Oshima, Yuri Touyama, Sayako Sakama

Modelling and Validation of a 3~MW Wind Turbine as a Basis for Structural Optimisation
Andreas Schulze, Zierath János, Rachholz Roman, Rosenow Sven-Erik, Bockhahn Reik, Woernle Christoph

Thursday - June 22, 2017 **10:40–11:40** **FORNM-5**
Chair: Zbyněk Šika **Formulations and Numerical Methods 5**

Room 266

A Method for Calculating and Continuing Static Solutions for Flexible Multibody Systems
Jacob P. Meijaard

Stability Bounds For Step Size Ratios In Variable Time Step Implementations Of Newmark Integrators
Victoria Wieloch, Martin Arnold

Towards Higher Order Multi-Symplectic Lie-Group Variational Integrators for Geometrically Exact Beam Dynamics – Avoidance of Shear Locking
Thomas Leitz, Sigrid Leyendecker

Thursday - June 22, 2017 **10:40–11:40** **BIO-6**
Chair: Paulo Flores **Biomechanics 6**

Room 366

Kinematic Validation Of A Human Thumb Model
Uday Dattaram Phutane, Michael Roller, Staffan Björkenstam, Joachim Linn, Sigrid Leyendecker

Optimal Control Prediction of a Dynamically Consistent Walking Motion for a Spinal Cord-Injured Subject Assisted by Orthoses
Míriam Febrer-Nafría, Francisco Mouzo, Urbano Lugrís, Benjamin J. Fregly, Josep Maria Font-Llagunes

Helicopter Collective Bounce Proneness: Which are the Good, the Bad (and the Ugly!) Pilot Biometrics?
Andrea Zanoni, Vincenzo Muscarello

Thursday - June 22, 2017 **12:25–12:55**

Thursday - June 22, 2017 **11:45-12:15** **Closing**

Room 256

Conference Closing and Best Paper Award Ceremony

Social Programme

Welcome Reception

The Welcome Reception will take place on Monday, June 19 at 18:30 h. in Respirium of The Czech Institute of Informatics, Robotics and Cybernetics (CIIRC), Jugoslávských partyzánů 1580/3, Prague 6 - Dejvice, which is located in the CTU campus very close to the conference venue.

Walking Prague Sightseeing Tour

The Prague Sightseeing Tour will be organized on Tuesday, June 20. The participants will be divided into several groups led by professional tourist guides. The meeting points are at the repection desk of hotels DAP, MEDA, DIPLOMAT and the venue conference registration desk which is listed on the invitations. Start of the tour will be at 17:30 h., meeting time will be at 17:15 h. The tour will end in "U Fleků" pub, Křemencova 11, Prague 1. Participants will obtain the voucher for a one meal and one drink.

Banquet and Boat Trip on Vltava River

Very special event will be organized on Wednesday, June 21. The participants will be transferred at 17:30 h. by coaches from the conference venue, Technická 4, Prague 6, to Troja Chateau, U Trojského zámku 1, Prague 7, which is a Baroque chateau, built in the 17th century, on the right bank of Vltava river in the outskirts of Prague with a French garden. The evening will continue by a boat trip on Vltava River to the city centre. The expected time of the end of the boat trip will be at 22:30 h.

Recommendation for presenters

1. The total time allocated for each oral presentationis as follows:

- Contributed papers 20 minutes including discussion
- Keynote lectures 40 minutes including discussion

Presenters should respect other speaker's rights and adhere strictly to their allocated time.

2. Each room is equipped, ready for use, with the computer projector for Power Point (.ppt or .pptx format) or PDF presentations. Should you prefer, you can use your own computer for the presentation.

3. Speakers are requested to be present in the room at least 15 minutes before the start of the session, to report to the Session-Chair and to deliver the files with their presentations. Presentation files can be uploaded any time from any computer at latest 15 minutes before presentation. Please name the file with the session abbreviation followed by the presenter name.

4. Speakers and participants in general are requested to use their identification badges at all times during the days of the conference, at that is essential to have access to the lunches, coffee-breaks and other social events like dinner, trip and banquet.

Thank you very much for your cooperation!

The Organizing Committee.

For your notes:


Legend
cemetery, Jewish cemetery
railway station
bus terminal
airport, landing stage
tourist information centre, hospital
modern architecture
church, synagogue
museum, gallery
modern art, nightlife
1 : 15 000
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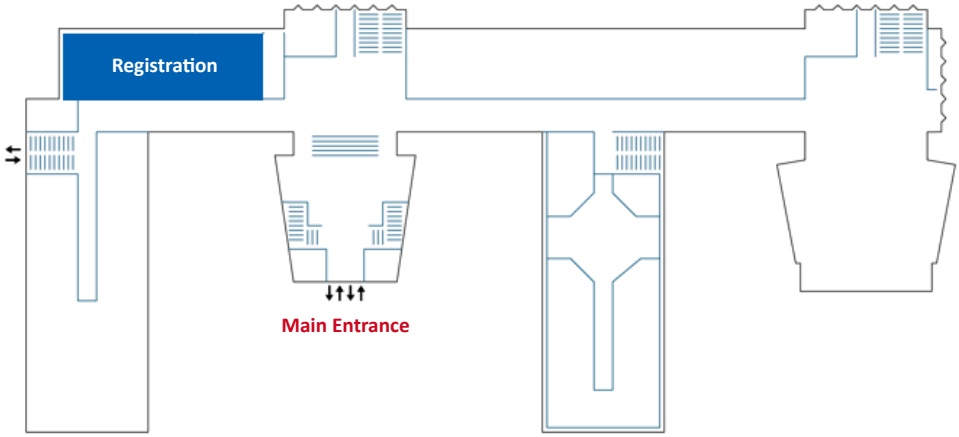
HOTEL DAP
HOTEL DIPLOMAT
AIRPORT, KLADNO
OŘECHOVKA
PRAHA-DEJVICE
LETNÁ
STARÉ MĚSTO
END OF BOAT
HRADČANY
JOSEFOV
STŘEŠOVICE
KARLOVY VARY
Praha 1
MALÁ STRANA
STRAHOV
PUB „U FLEKŮ“
VE MĚSTO
SMÍCHOV
Praha 5
Výtoň
Praha 2
PÍSEK, STRAKONICE
VYŠEHRAD
Metro

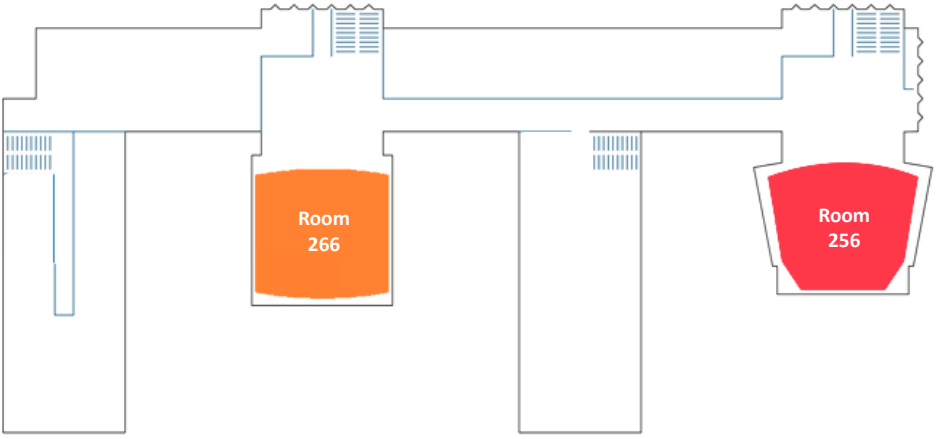

ÚSTÍ N. LABEM, LIBEREC
PELC-TYROLKA
Praha 8
VYCHOVATELNA
PRAHA-HOLEŠOVICE
HOLEŠOVICE
PRAHA - HOLEŠOVICE východ
PRAHA - ŠUTNY
NA HÁJKU
NA BALABENCE
PALMOVKA
KARLÍN
POD BALKÁNEM
PRAŽAČKA
TRIP
PRAHA - MASARYKOVO NÁDR.
PRAHA - FLORENC
Praha 3
ŽIŽKOV
nákladové nádraží PRAHA-ŽIŽKOV
PRAHA - HLAVNÍ NÁDRAŽÍ
VINOHRADY
VRŠOVICE
PRAHA-VRŠOVICE
HRADEC KRÁLOVÉ
PARDUBICE
NUSLE
NO, ČESKÉ BUDĚJOVICE

Location of Rooms

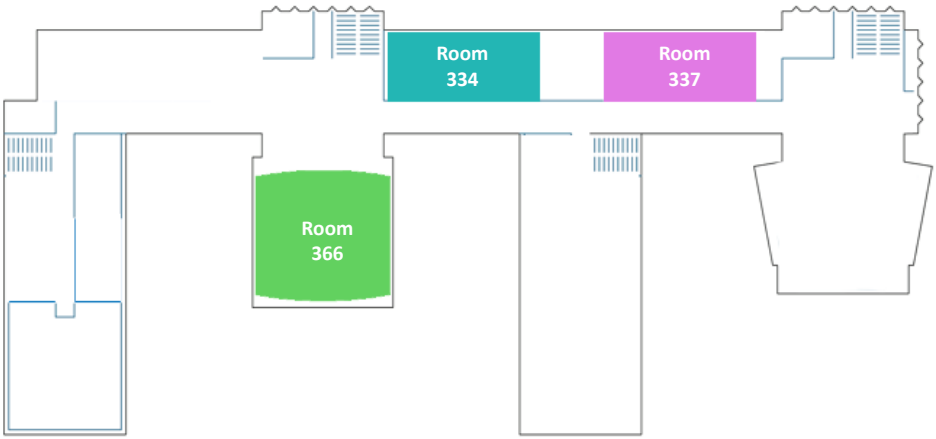
GROUND FLOOR



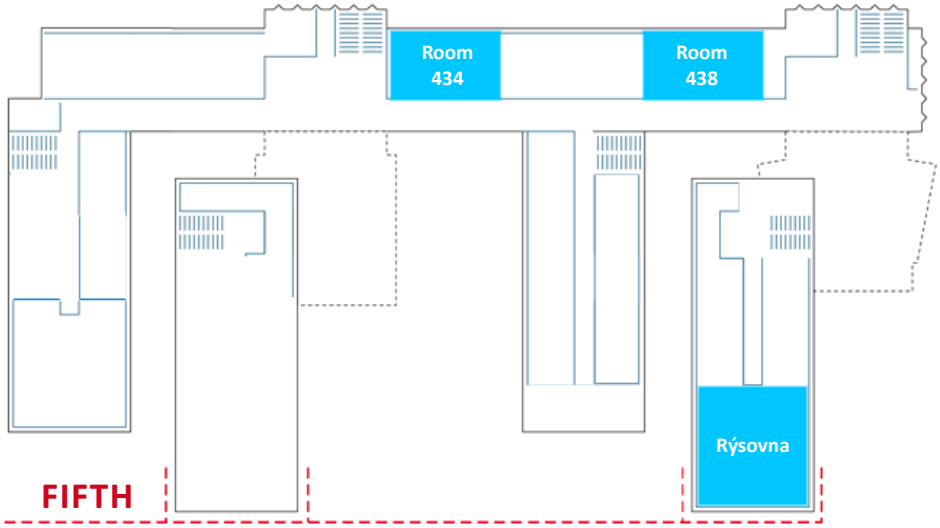
SECOND FLOOR



THIRD FLOOR



FOURTH/FIFTH FLOOR - Coffee breaks and lunches will be served on these floors.



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