

Scientific Program

Program Overview

Detailed Technical Program



Program Overview

Sunday, June 29, 2014

16:00 - 19:00	Pre-Registration	Convention Hall Lobby (2F)
17:30 - 19:00	Welcome Reception	Convention Hall Lobby (2F)

Monday, June 30, 2014

Registration Desk Opens at 8:00 a.m.

09:00 - 09:20	OPENING CEREMONY					Room 201-2
09:20 - 10:00	KEYNOTE	Arend Schwab <i>On Bicycle Dynamics and Rider Control</i>				Room 201-2
10:10 - 11:30	FLX1 Room 201-2	VEH1 Room 203	OTH1 Room 204	ROB1 Room 206	MOD1 Room 207	ALG1 Room 208
11:30 - 11:40	COFFEE BREAK					
11:40 - 12:40	FLX2 Room 201-2	VEH2 Room 203	OTH2 Room 204	ROB2 Room 206	OPT1 Room 208	
12:40 - 13:40	LUNCH					
13:40 - 15:00	FLX3 Room 201-2	VEH3 Room 203	OTH3 Room 204	ROB3 Room 206	CON1 Room 207	OPT2 Room 208
15:00 - 15:20	COFFEE BREAK					
15:20 - 16:00	KEYNOTE	Dan Negrut <i>The Interplay between Frictional Contact and High Performance Computing in Many-Body Dynamics Simulation</i>				Room 201-2
16:00 - 16:10	COFFEE BREAK					
16:10 - 17:50	ROB4 Room 201-2	VEH4 Room 203	OTH4 Room 204	MEC1 Room 206	MOD2 Room 207	HPC1 Room 208
18:30 - 20:30	Conference Reception - Homers Hotel					

Tuesday, July 1, 2014

Registration Desk Opens at 8:00 a.m.

09:00 - 09:40	KEYNOTE	Javier Cuadrado <i>Challenges in the Use of Multibody Dynamics for the Study of Human Body Motion in Medical Applications</i>				Room 201-2
10:00 - 11:20	FLX4 Room 201-2	VEH5 Room 203	MEC2 Room 204	BIO1 Room 206	OPT3 Room 207	
11:20 - 11:40	COFFEE BREAK					
11:40 - 12:40	FLX5 Room 201-2	VEH6 Room 203	MEC3 Room 204	BIO2 Room 206	OPT4 Room 207	MOD3 Room 208
12:40 - 13:40	LUNCH					
13:40 - 15:00	FLX6 Room 201-2	VEH7 Room 203	MEC4 Room 204	BIO3 Room 206	OPT5 Room 207	CON2 Room 208
15:00 - 15:20	COFFEE BREAK					

15:20 - 16:00	KEYNOTE	Jinyang Liu <i>Dynamic Modeling and Experiment Investigation of Rigid-flexible Coupling Multibody Systems</i>				Room 201-2
16:00 - 16:10	COFFEE BREAK					
16:10 - 17:50	FLX7 Room 201-2	VEH8 Room 203	EFF1 Room 204	BIO4 Room 206	OPT6 Room 207	MDA1 Room 208

Wednesday, July 2, 2014

Registration Desk Opens at 8:00 a.m.

09:00 - 09:40	KEYNOTE	Ja Kyum Koo <i>Investigation on the Missing Link between Multi-body System Dynamics and NVH</i>				Room 201-2
10:00 - 11:20	FLX8 Room 201-2	BEN1 Room 203	CON3 Room 204	TCM1 Room 206	ROT1 Room 207	ROB5 Room 208
11:20 - 11:40	COFFEE BREAK					
11:40 - 12:40	FLX9 Room 201-2	EFF2 Room 203	BIO5 Room 204	TCM2 Room 206	ROT2 Room 207	VEH9 Room 208
12:40 - 13:40	LUNCH					
14:00 - 18:30	Excursion - Gyeongju Cultural Heritage Tour					
18:30 - 23:00	Conference Banquet - Hotel Hyundai Gyeongju					

Thursday, July 3, 2014

Registration Desk Opens at 8:00 a.m.

09:00 - 09:40	KEYNOTE	Andres Kecskemethy <i>Generation of Minimal Coordinate Formulations in Multibody Applications</i>				Room 201-2
10:00 - 11:20	BEN2 Room 201-2	TCM3 Room 203	VEH10 Room 204	OTH5 Room 206	OTH6 Room 207	EFF3 Room 208
11:20 - 11:40	COFFEE BREAK					
11:40 - 12:40	VEH12 Room 201-2	ROT3 Room 203	VEH11 Room 204	OTH7 Room 206	OTH8 Room 207	EFF4 Room 204
12:40 - 13:40	LUNCH					
13:40 - 14:20	KEYNOTE	Yoshiaki Terumichi <i>A Systematic Approach of Numerical Simulation and Experiments Applied for the Study on the Railway Vehicle Dynamics on Large Earthquake</i>				Room 201-2
14:20 - 15:00	CLOSING CEREMONY					Room 201-2

ALG Algorithms, Integration Codes, and Software
BEN Benchmark Problems in Multibody System Dynamics
BIO Biomechanics
CON Contact and Impact Problems
EFF Efficient Methods and Real-Time Applications
FLX Flexible Multibody Systems: FLX8 sessions
HPC High Performance Computing
MDA Multidisciplinary Approaches

MEC Control and Mechatronics
MOD Modeling, Formalisms, and DAE Solution Method
OPT Optimization, Sensitivity Analysis and Parameter Identification
OTH Multibody Applications, Experiments and Other Topics
ROB Robotic Systems
ROT Dynamics of Machines and Rotating Structures
TCM Theoretical and Computational Methods
VEH Dynamics of All Vehicles

Detailed Technical Program

Monday, June 30, 2014

OPENING CEREMONY	09:00 - 09:20 Room 201-2
Sung-Soo Kim, General Chair IMSD2014-ACMD2014 Peter Eberhard, Chairman IMSD Hong Hee Yoo, Chairman ACMD	
KEYNOTE / Arend Schwab , Delft University of Technology, Netherlands <i>On Bicycle Dynamics and Rider Control</i>	09:20 - 10:00 Room 201-2
Session Chair : Wan Suk Yoo, Pusan National University	
FLX 1 of 9 / Flexible Multibody Systems	10:10 - 11:30 Room 201-2
Session Chair : Aki Mikkola, Lappeenranta University of Technology Hiroyuki Sugiyama, University of Iowa	
Dynamic Analysis of Variable Cross-section Beams using the Absolute Nodal Coordinate Formulation Chunzhang ZHAO, Haidong YU, Hao WANG, Yong ZHAO	
Convergence Characteristics of Thin ANCF Shell Elements in Arbitrary and Initially curved mesh Per Hyldahl, Aki M. Mikkola, Ole Balling, Jussi T. Sopanen	
Comparison of h- and p-refinements in the Absolute Nodal Coordinate Formulation Based Euler-Bernoulli Beam Elements Antti I. Valkeapää, Marko K. Matikainen, Aki M. Mikkola	
A New Construction Method for Dynamics of Rigid-flexible Coupling Multibody Systems Based on Absolute Node Coordinate Formulation Xiaoshun Zhang, Dingguo Zhang, Jiazhen Hong	
VEH 1 of 12 / Dynamics of All Vehicles	10:10 - 11:30 Room 203
Session Chair : Jorge Ambrosio, Instituto Superior Tecnico Zhuyong Liu, Shanghai Jiao Tong University	
Analysis of Wheel Loader Dynamic Characteristic with Working Load Kwangseok Oh, Hakgu Kim, Kyungeun Ko, Panyoung Kim, Jaho Seo, Kyongsu Yi	
Vehicle Dynamic Simulation Considering Suspension Inertia Force Sang-Do Na, Chang-Gyu Yoon, Dong-Woon Park, Kwang-Suk Kim, Wan-Suk Yoo	
Stability Analysis of a Staggered Parallel Two-Wheel Personal Mobility Vehicle Jeffrey Too Chuan Tan, Ratanachote Ingcanuntavaree, Yoshihiro Suda	
Study on the Acceleration Pedal Motion Parametersto Determine Sudden Unintended Acceleration Tae oh Tak, Jun ho An, Ji su Kim	
OTH 1 of 8 / Multibody Applications, Experiments and Other Topics	10:10 - 11:30 Room 204
Session Chair : Frank Naets, KU Leuven Taichi Shiiba, Meiji University	
Contact Analysis of Rope and Sheave Using ANCF S. Takehara, M. Kawarada, K. Hase	
Dynamic Analysis of a Cable System in Three Dimensions Xiangqian Zhu, Wan-Suk Yoo	
Kink-wave Propagation in Steel Wire Ropes subjected to a Perpendicular Impact in High-speed Applications Bing Xu, Pengpeng Dong, Junhui Zhang, Song Zhang	
Spring Modeling for the Performance Evaluation of a Spring Operating Mechanism in a Gas Insulated Circuit Breaker Dae-Woo Lee, Jeong-Hyun Sohn, Jae-Yeol Kim, Byung-Tae Bae, Jin-Ho Kim	

ROB 1 of 5 / Robotic Systems Session Chairs : Subir K. Saha, IIT Delhi Alberto Martini, University of Bologna	10:10 - 11:30 Room 206
Development of a Shoulder Joint with a Variable Stiffness Mechanism <u>Yoshikatsu Naito</u> , Koichi Koganezawa	
Geometric Synthesis of Compliant Foot Module of a Lower-Limb Exoskeleton for Rough-Terrain Tasks <u>Man Bok Hong</u> , Ji-Hyeun Wang	
Modeling and Control of Pneumatic Artificial Muscles in an Antagonistic Set-up Joerg Baur, <u>Christoph Schuetz</u> , Julian Pfaff, Heinz Ulbrich	
Haptics Exoskeleton for tele-operation of Industrial Robot Md. Zubair, <u>Bhivraj Suthar</u> , Sachin Kansal, Sudipto Mukherjee	
MOD 1 of 3 / Modeling, Formalisms, and DAE Solution Method Session Chair : Olivier Bauchau, SJTU-Michigan University Juhwan Choi, FunctionBay Inc.	10:10 - 11:30 Room 207
Formulations of Viscoelastic Constitutive Laws for Beams in Flexible Multibody Dynamics Olivier A. Bauchau, <u>Zijing Lao</u> , Mei Lyu, Stefanie Brändle, Joachim Linn	
Review of RecurDyn Integration Methods <u>Graham G. Sanborn</u> , Juhwan Choi, Jin H. Choi	
Variational Time Stepping Method for Analytical System Dynamics Models <u>Claude Lacoursière</u> , Tomas Sjöström	
Symplectic Integration Algorithm based on Time Finite Element Method for Multibody Dynamics System with Holonomic Constraint <u>Haijun Peng</u> , Qiang Gao, Zhigang Wu, Wanxie Zhong	
ALG 1 of 1 / Algorithms, Integration Codes, and Software Session Chair : Corina Sandu, Virginia Polytechnic Institute and State University Hao WANG, Shanghai Jiao Tong University	10:10 - 11:30 Room 208
Dynamic Analysis of a Concept Design of an Independent-Wheel Type Ultra-High-Speed Train <u>Jin-Hee Lee</u> , Tae-Won Park, Kyung-Soek Sim, In-Kyoung Hwang, Nam-Po Kim	
Multibody Analysis of an Inverted-pendulum Vehicle and Driver Operation during Acceleration and Deceleration <u>Chihiro Nakagawa</u> , Shunsuke Arakawa, Atsuhiko Shintani, Tomohiro Ito	
A Novel Parallel Algorithm for Flexible Multibody Dynamics Simulation Seundo Heo, Genyong Wu, and <u>Olivier A. Bauchau</u>	
Coupling of a Nonlinear Finite Element Solver in Multibody Dynamics <u>Michael Collingridge</u> , Stephen Riley, Weixin Shen, Hemant Patel	
COFFEE BREAK	11:30 - 11:40
FLX 2 of 9 / Flexible Multibody Systems Session Chair : John McPhee, University of Waterloo Hong Hee Yoo, Hanyang University	11:40 - 12:40 Room 201-2
Dynamics Analysis of Lateral Vibration of an Axially Translating Flexible Link <u>Heonseop Shin</u> , Sungsoo Rhim	
A Computationally Efficient and Robust Geometrically-Exact Curved Beam Formulation for Multibody Systems <u>Hui Ren</u>	

Modeling and Analysis Lightweight Air Suspension for Electric Vehicle Using Flexible Multi-body Dynamics
Yoon-Sik JUNG, Heon-Seop SHIN, Sungsoo RHIM, Jin-Hwan CHOI

VEH 2 of 12 / Dynamics of All Vehicles

Session Chair : Jose L. Escalona, University of Seville
Graham Sanborn, FunctionBay Inc.

11:40 - 12:40
Room 203

Evaluation of Motor In-wheel Behavior in Loss-of-contact Scenarios and Analysis of Potential Measures for Performance Improvement

Javier Cuadrado, David Vilela, Alberto Luaces, Adrián Martín, Iñaki Iglesias, Alberto Peña

Development of optimization technique for hardness part of vehicle with second-order stiffness characteristic
Changwook Lee, Huije Cho, Seokyoung Chae, Dongzhe Zhu, Daesung Bae

Cornering Stability Improvement by Gyro Moment in Narrow Tilting Vehicle

Jeffrey Too Chuan Tan, Yitsao Huang, Yoshihiro Suda, Akira Mizuno, Munehisa Horiguchi

OTH 2 of 8 / Multibody Applications, Experiments and Other Topics

Session Chair : Roland Pastorino, KU Leuven
Caishan Liu, Peking University

11:40 - 12:40
Room 204

Braking Performance Study of an Escalator System Using Multibody Dynamics Simulation

Chan Jong Park, Gero Gschwendtner

Research on Dynamic Characteristics of New Rocker-Pin Jointed Chain Continuously Variable Transmission (CVT)

Zengming. Feng, Qianshuai. Pu, Yanru. Luo, Yanhui. Jia

A 3D Multibody Model for the Investigation of the Chain Drive Derailment between Sprockets

Claudio Autore, Ettore Pennestri, Pier Paolo Valentini

ROB 2 of 5 / Robotic Systems

Session Chair : Koichi Koganezawa, Tokai University
Vadim Chernyshev, Volgograd State Technical University

11:40 - 12:40
Room 206

Modeling of the Dynamics of the Walking Machine with the Cyclic Propulsors as System Solids with Elastic and Damping Relations

Vadim V. Chernyshev, Eugeny S. Briskin, Victor V. Zhoga, Alexander V. Maloletov, Nikolay G. Sharonov

Dynamics Analysis and Optimization of Spinal Motion for the Galloping of a Quadruped Robot

Byeonghun Na, Jungsu Choi, Sehoon Oh, Kyoungchul Kong, Kyoungduk Park

Active Dynamic Balancing of the Redundantly Actuated 2RR Planar Parallel Manipulator

Mario Acevedo

OPT 1 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

Session Chair : Peter Eberhard, University of Stuttgart
Anas batou, Universite Paris-Est Marne-la-Vallée

11:40 - 12:40
Room 208

The Use of the Adjoint Method for Solving Typical Optimization Problems in Multibody Dynamics

Karin Nachbagaer, Stefan Oberpeilsteiner, Wolfgang Steiner

Simultaneous Type and Number Synthesis of Planar Linkage Mechanisms

Suh In Kim, Yoon Young Kim

Second Order Sensitivities of the Dynamic Response of Multibody Systems with Penalty Formulations

Daniel Dopico, Yitao Zhu, Adrian Sandu, Corina Sandu

LUNCH

12:40 - 13:40

FLX 3 of 9 / Flexible Multibody Systems Session Chair : Ben Jonker, University of Twente Nobuyuki Kobayashi, Aoyama Gakuin University)	13:40 - 15:00 Room 201-2
Dynamic Modeling and Experimental Verification of Flexible Multibody System Undergoing Pre-Defined Angular Motions Moon K. Kwak, Dong-Ho Yang	
Second-Order Formulation for Three-Dimensional Beam Elements in Large Deflection Multibody Dynamics Problems J.B. Jonker	
An Analysis of System with Mass and Extremely Flexible Structure by the Use of the System's Complementarity Yoshiki Sugawara, Nobuyuki Kobayashi, Taku Chida	
Necessity of Transient-State Unwinding Equation of Motion for an Unwinding Cable Kun-Woo Kim, Jin-Seok Jang, Jae-Wook Lee, Wan-Suk Yoo	
VEH 3 of 12 / Dynamics of All Vehicles Session Chair : Tae oh Tak, Kangwon National University Olivier Verlinden, University of Mons	13:40 - 15:00 Room 203
A Development of Multi Body Dynamics Model for Prediction of Shift Effort in Manual Transmission Woonggi Kim, Wangoo Kim, Junhyung Lee, Daesung Bae	
Multibody Modelling of an Automatic Gearbox: Calculation of Acceleration Performance G. Kouroussis, P. Dehombreux, O. Verlinden	
Development of the NVH analysis method of the gear train system under the variable driving conditions Heunghyeok Yim, Wangoo Kim, Huije Cho, Jinkuk Park, Namil Jeon, Zhao Liu, Daesung Bae	
OTH 3 of 8 / Multibody Applications, Experiments and Other Topics Session Chair : Pengxiang Hu, Tsinghua University Francisco Gonzalez, McGill University	13:40 - 15:00 Room 204
Effect of Elasticity and Manufacturing Tolerances on the Kinematic and Dynamic Performances of a Cardan Joint Ettore Pennestri, Valerio Rossi, Pier Paolo Valentini	
A study about Sprocket Wear of a Tracked Vehicle Undercarriage System Sung-Ho Baek, Dong-Pil Lim, Young-Sun Yoo, Sang-Min An, Seung-Jin Heo	
Fatigue Analysis of Large Non-linear Finite Element Models using Modal Reduction and Flexible Multibody Theory Anders Elkjær, TausWind-Larsen, Klaus Kjølhed, Ole Balling	
Modelling of mechanical ring-tracking in a pushbelt variator for the analysis of the multi-body system dynamics Grundl, Kilian, Schindler, Thorsten, Rixen, J. Daniel, Ulbrich, Heinz, Tran, Minh-Duc, Velde, v.d. Arie, Yildiz, Semih	
ROB 3 of 5 / Robotic Systems Session Chair : Sungsoo Rhim, Kyung Hee University Abhinandan Jain, Jet Propulsion Laboratory	13:40 - 15:00 Room 206
Dynamics Compensation for the Control of Articulated Multi-Limb Robots Abhinandan Jain, Calvin Kuo, Ivan Sinkarenko	
Implement of Sensor Fusion Algorithm For Stable Grasping Jae Hyeon Kim, Seung Hoon Shin, J. C. Koo	
Periodic Servo-Constraints for Stabilizing Underactuated Multibody Systems László Bencsik, László Kovács, Ambrus Zelei	

CON 1 of 4 / Contact and Impact Problems

Session Chair : Parviz Nikravesh, University of Arizona
Juhwan Choi, FunctionBay Inc.

13:40 - 15:00
Room 207

On the Behavior of Solutions to the Problem of Plane Extremal Point Tracking for Smooth Curves
Jochen Damerau, Robert J. Low

Wear Prediction in Dry Revolute Clearance Joints in Multibody Systems
Paulo Flores

A Modified Elastic-Plasticity Constitutive Model for the Impact of Two Balls
Daolin Ma, Caishan Liu, Xue Chen

Development of Lateral Impact Tester and Verification of Impact test
Seung-Kyun Jin, Young-Shin Lee, Tae-Ho Yang, Kang-Sic Kim

OPT 2 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

Session Chair : Javier Ros, Public University of Navarre
Olivier Bruls, University of Liège

13:40 - 15:00
Room 208

A Comparison Study of Chebyshev Inclusion Functions and Polynomial Chaos for Multibody Mechanical System under Uncertainties
Xingxing Feng, Yunqing Zhang, Jinglai Wu, Zeyu Ma

Dimensional Synthesis Based Elastodynamic Performance Optimization of 5R Parallel Mechanism
Belkacem BOUNAB, Yamina NEBIH

Automatic Determination of the Symbolic Base Inertial Parameters of Multibody Systems
J. Ros, A. Plaza, X. Iriarte, V. Mata

COFFEE BREAK

15:00 - 15:20

KEYNOTE / Dan Negrut, University of Wisconsin, USA

The Interplay between Frictional Contact and High Performance Computing in Many-Body Dynamics Simulation

15:20 - 16:00
Room 201-2

Session Chair : Kurt Anderson, Rensselaer Polytechnic Institute

COFFEE BREAK

16:00 - 16:10

ROB 4 of 5 / Robotic Systems

Session Chair : Peter Betsch, Karlsruhe Institute of Technology
Vadim Chernyshev, Volgograd State Technical University

16:10 - 17:50
Room 201-2

Linear Progression Locomotion of a Wheelless Type Snake Robot Using Torque Control
Myoungho Kim, Hocheol Shin

Towards the Elaboration of 3D Dynamic Model for Push/Pull Cable (PPC) Actuation System
Svetlana Grosu, Chris Verheul, Carlos Rodriguez-Guerrero, Bram Vanderborght, Dirk Lefeber

Design and Control of Tendon-Driven 2-DOF Actuators with Capability of Self-Stress Adjustment
Hyunhwan Jeong, Youngsu Cho, Joono Cheong

Dynamics and Actuating Torque Optimization of Planar Robots
Vinay Gupta, Himanshu Chaudhary, Subir K. Saha

Stopper Assembly of Rear block using Sliding Perturbation Observer based Force Estimation and Interference Fit
Sung Min Yoon, Gyu Ho Byun, Min Cheol Lee

VEH 4 of 12 / Dynamics of All Vehicles Session Chair : Hyung-Suk Han, Korea Institute of Machinery and Materials Enrico Meli, Florence University	16:10 - 17:50 Room 203
Running Performance Analysis of Steering Bogie using Independently Rotating Wheels with Oblique Axle <u>K. Ejiri</u> , Y. Michitsuji, Y. Suda, S. Lin	
On Degenerate Position of a Wheelset and Rail <u>Behrooz Fallahi</u> , <u>Vahid Bateni</u>	
A Study on Steering Bogie System to Improve Running Performance of a Railway Vehicle on Curved Track <u>Kyung Seok Sim</u> , Hyun Moo Hur, Tae Won Park, Jin Hee Lee, Myeong Jun Kim, Sung Taek Hong	
Weighing in Motion of Railway Vehicles: Development of Innovative Systems and Performance Analysis <u>A. Innocenti</u> , L.Marini, E.Meli, L.Pugi, A.Rindi	
Dynamic Modeling of Hybrid Electro Power Steering System for Heavy Duty Vehicles to Estimate the Motor Pump Unit Capacity <u>Ji in Park</u> , Kwangki Jeon	
OTH 4 of 8 / Multibody Applications, Experiments and Other Topics Session Chair : Wan Suk Yoo, Pusan National University Etsujiro Imanishi, KOBE STEEL, LTD.	16:10 - 17:50 Room 204
A Study on Efficient Motion Generation for Biomimetic Lizard Robot <u>Bongcheol Seo</u> , Sung-Soo Kim	
Analysis of Obstacle Climbing Manoeuvres for Planetary Exploration Rovers <u>Bahareh Ghotbi</u> , Eric Karpman, Francisco González, József Kövecses, Jorge Angeles	
Development of Excavator Simulation Model to Predict Slew Bearing Failure <u>Chao Sun</u> , Daesung Bae, Sulki Seong, Wangoo Kim, Jaehong Kim	
Multibody Dynamic Approach for Control Validation of Mass-varying Flexible Rockets <u>Pengxiang Hu</u> , Yunfei Yang, Zhihua Zhao, Gexue Ren	
Dynamic modeling and simulation of dual arm robot <u>Dong Il Park</u> , Chanhun Park, Hyunmin Do, Taeyong Choi, Jinho Kyung	
MEC 1 of 4 / Control and Mechatronics Session Chair : Makoto Iwamura, Fukuoka University Wojciech Blajer, University of Technology and Humanities in Radom	16:10 - 17:50 Room 206
Study on a Driving Velocityestimation without DB for Unmanned Ground Vehicle <u>Jung Samuel</u> , Wan-Suk Yoo	
Stability Control of Four-Wheel Differentially Driven Mobile Robot with Variable Center of Mass <u>Seungwoo Jeon</u> , <u>Wootae Jeong</u> , Duckshin Park	
Alternative Task Definitions for Path Tracking Control of Underactuated Robots <u>A. Zelei</u> , L. Bencsik, G. Stépán	
Dynamic analysis of a 5DOF Passive Reaction Force Compensation Device with mover modeling <u>Duc Canh Nguyen</u> , Hyeong Joon Ahn	
MOD 2 of 3 / Modeling, Formalisms, and DAE Solution Method Session Chair : Werner Schiehlen, Universität Stuttgart KeWei Zhang, Wuhan Polytechnic University	16:10 - 17:50 Room 207
Order Reduction in Time Integration caused by Velocity Projection <u>Martin Arnold</u> , Alberto Cardona, Olivier Brüls	

Nonlinear Three-Dimensional Beam Theory for Flexible Multibody Dynamics
Shilei Han, [Olivier A. Bauchau](#)

Co-Simulation Methods for Solver Coupling with Algebraic Constraints: Semi-Implicit Coupling Techniques
[B. Schweizer](#), [D. Lu](#)

A Unified Formulation for Perfect and Imperfect Mechanical Joints
[Jorge Ambrósio](#), [João Pombo](#)

Three-Dimensional Plate Theory for Flexible Multibody Dynamics
[Shilei Han](#), [Olivier A. Bauchau](#)

HPC 1 of 1 / High Performance Computing

Session Chair : [Dan Negrut](#), University of Wisconsin Madison
[Jeong Hyun Sohn](#), Pukyong National University

16:10 - 17:50
Room 208

A fluid-solid interaction approach for the simulation of polymer motion in Newtonian fluid
[Arman Pazouki](#), [Radu Serban](#), [Dan Negrut](#)

Chrono: a parallel multi-physics library for rigid-body, flexible-body, and fluid dynamics
[Alessandro Tasora](#), [Hammad Mazhar](#), [Andrew Seidl](#), [Dan Melanz](#), [Arman Pazouki](#), [Justin Madsen](#), [Daniel Kaczmarek](#), [Radu Serban](#), [Dan Negrut](#)

Dynamic Analysis of a Floating Body in the Fluid by Using the Smoothed Particle Hydrodynamics
[Chul Woong Jun](#), [Jeong Hyun Sohn](#)

Gauging military vehicle mobility through many-body dynamics simulation
[Daniel Melanz](#), [Hammad Mazhar](#), [Dan Negrut](#)

Optimization of operating and assembling mass properties of solid elements on heterogeneous platforms using OpenCL framework
[Jihyun Jung](#), [Chulho Lee](#), [Huije Cho](#), [Daesung Bae](#)

Conference Reception - Homers Hotel

18:30 - 20:30

Tuesday, July 1, 2014

KEYNOTE / Javier Cuadrado, University of La Coruna, Spain

Challenges in the Use of Multibody Dynamics for the Study of Human Body Motion in Medical Applications

09:00 - 09:40
Room 201-2

Session Chair : John McPhee, University of Waterloo

FLX 4 of 9 / Flexible Multibody Systems

Session Chair : Wim Desmet, University of Leuven
Graham Sanborn, FunctionBay Inc.

10:00 - 11:20
Room 201-2

Numerical Approach for Flexible Body Motion with Large Displacement and Time-Varying Length
[Hiroyuki Hayashi](#), Shoichiro Takehara, Yoshiaki Terumichi

New triangular shell element with exact geometry representation in multibody system dynamics
[H.J. Chang](#), C. Liu, Q. Tian, H.Y. Hu

Issues in the Reduction of Parametric Elastic Multibody Systems
[Peter Eberhard](#), Michael Fischer

A study of three-node higher-order gradient beam elements based on the absolute nodal coordinate formulation
[Marko K. Matikainen](#), Oleg Dmitrochenko

VEH 5 of 12 / Dynamics of All Vehicles

Session Chair : Werner Schiehlen, Universität Stuttgart
Jose L. Escalona, University of Seville

10:00 - 11:20
Room 203

Modeling of Railway Vehicles with Symbolic Computation and Contact Look-up Tables for Real-Time Simulations
[José L. Escalona](#), Javier F. Aceituno

Moving Track Model with Rail Roll Deflection for Curve Negotiation Analysis of Railroad Vehicles
[Toshihisa Nakajima](#), Yuta Hiramane, [Hiroyuki Sugiyama](#)

Dynamic Characteristics of Double Stack Train with shortest bogie
[Nam-Po Kim](#), Won-Hee You

Study on Dynamics of Lightweight Railway Vehicle in Wet Condition
[Shihpin Lin](#), Yuichiro Takino, Yoshihiro Suda, Masahisa Kageyama, Atsushi Tanimoto, Shinichiro Koga

MEC 2 of 4 / Control and Mechatronics

Session Chair : Makoto Iwamura, Fukuoka University
Sigrid Leyendecker, University of Erlangen

10:00 - 11:20
Room 204

Experimental Studies of Control Concepts for a Parallel Manipulator with Flexible Links
[Markus Burkhardt](#), Robert Seifriedy, Peter Eberhard

A General Purpose Optimal Trajectory Planning Algorithm for Planar Flexible Multibody Systems
[Makoto Iwamura](#), Shingo Uchikawa, Naruki Hanada

A DAE stable inversion method for feedforward control of robotic systems with elastic links
[Olivier Brûls](#), Guaraci Jr. Bastos, Robert Seifried

Vibration Suppression of a Fuel Rod in Water Using Feedback Linearization and Input Shaping Control
[Van Duong Phan](#), Umer Hameed Shah, Jae Young Jeon, Keum-Shik Hong

BIO 1 of 5 / Biomechanics Session Chair : Arend Schwab, Delft University of Technology Maxime Raison, Ecole Polytechnique de Montreal	10:00 - 11:20 Room 206
Development of a Three-dimensional Multibody Model of the Human Leg and Foot for application in Movement Analysis Tiago M. Malaquias, Sérgio B. Gonçalves, Miguel T. Silva	
Generation of Optimal Gaits for Impactless Bipedal Walking on Slopes via Genetic Algorithm Lulu Gong	
A 3D Foot-Ground Model for Walking and Running using Disk Contacts M. Millard, A. Kecskeméthy	
OPT 3 of 6 / Optimization, Sensitivity Analysis and Parameter Identification Session Chair : Corina Sandu, Virginia Polytechnic Institute and State University Anas batou, Universite Paris-Est Marne-la-Vallee	10:00 - 11:20 Room 207
On the Parameter Estimation for a Simulation Model of a Small Biological Joint Sebastian Ihrle , Albrecht Eiber, Peter Eberhard	
Optimum Dynamic Balancing of a Planar Five-bar Mechanism Using Genetic Algorithm Kailash Chaudhary, Himanshu Chaudhary	
A new approach for large antenna mesh reflector form-finding P.Li , W. Hu, C. Liu, Q. Tian, H.Y. Hu	
Application of firefly algorithm in optimization of control system of mechatronic device for gait reeducation Krzysztof Kawlewski	
COFFEE BREAK	11:20 - 11:40
FLX 5 of 9 / Flexible Multibody Systems Session Chair : Wan Suk Yoo, Pusan National University Ben Jonker, University of Twente	11:40 - 12:40 Room 201-2
Strongly Coupled approach for integrating non-linear local Finite Element models in Multibody System Dynamics Frédéric Cugnon , Philippe Jetteur, Frédéric Pascon, Tom van Eekelen	
Flexible Multi-body Dynamical Simulation of Astromesh Truss Deployment Yun Peng , Zhihua Zhao, Yanhui Ma, Jungang Yang, Gexue Ren	
Non-rolling Mesh for A Rolling Finite-Element Tire Model Omid Kazemi, Adrian P. Ribaric, Parviz E. Nikravesh , Seongho Kim	
VEH 6 of 12 / Dynamics of All Vehicles Session Chair : Yoshiaki Terumichi, Sophia University Hyung-Suk Han, Korea Institute of Machinery and Materials	11:40 - 12:40 Room 203
Evolution of Wheel and Rail Profile Wear: Development of an Innovative Model Designed for Complex Railway Networks A. Innocenti, L. Marini, E. Meli, G. Pallini, A. Rindi	
Numerical Analysis for Coupled Train Considering 3D Wheel/Rail Contact Geometry Natsumi Nakano , Yoshiaki Terumichi	
Study on a Coupled Modeling of Maglev Vehicle and Switch Guideway Jong-Boo Han , Jin Woo Park, Ki-Jung Kim, Hyung-Suk Han, Jong-Min Lee, Sung-Soo Kim	

MEC 3 of 4 / Control and Mechatronics Session Chair : Sungsoo Rhim, Kyung Hee University Olivier Bruls, University of Liege	11:40 - 12:40 Room 204
New Methodology for Precise Satellite Formation-keeping in the Presence of System Uncertainties <u>Hancheol Cho</u> , Thanapat Wanichanon, Firdaus E. Udwardia	
Controllability of Planar Manipulators with Passive Joints Subject to Servo-Constraints <u>Wojciech Blajer</u> , Krzysztof Kołodziejczyk	
Control of Inertially Stabilized Platform Using Disturbance Observer KyungJun Choi, <u>MoonCheol Won</u>	
BIO 2 of 5 / Biomechanics Session Chair : Paulo Flores, University of Minho Joon-Shik Yoon, FunctionBay Inc.	11:40 - 12:40 Room 206
Kinematic Identification of the Spine: a Multibody Approach <u>Gabriel Abedrabbo</u> , Maxime Raison, Philippe Mahaudensy, Christine Detrembleury, Maryline, Mousny, Olivier Cartiau, Paul Fiset	
Dynamic analysis of a patellar tendon reflex induced by tapping motion <u>Moon Jeong Kang</u> , Young Nam Jo, Hong Hee Yoo	
Design of Loading Setup for Craniovertebral Junction <u>Md. Zubair</u> , Sachin Kansal, Sudipto Mukherjee, Deepak Kumar Gupta, Shashank Kale	
OPT 4 of 6 / Optimization, Sensitivity Analysis and Parameter Identification Session Chair : Martin Arnold, Martin Luther University Halle-Wittenberg Jinyang Liu, Shanghai Jiao Tong University	11:40 - 12:40 Room 207
Topology Optimization of Members of Flexible Multibody Systems using the Floating Frame of Reference Approach <u>Robert Seifried</u> , Alexander Held, Ali Moghadasi	
Hysteresis Modeling of a Pneumatic Brake Chamber in a Heavy Commercial Vehicle <u>Jatheendranath Moothayil</u> , Srinidhi K., Shankar C. Subramanian	
Manual and Automatic Direct-Differentiation Methods for the Sensitivity Analysis of Multibody Systems in Independent Coordinates Alfonso Callejo, <u>Daniel Dopico</u> , Corina Sandu, Javier García de Jalón	
MOD 3 of 3 / Modeling, Formalisms, and DAE Solution Method Session Chair : Subir K. Saha, IIT Delhi Bernhard Schweizer, Institute for Structural Dynamics	11:40 - 12:40 Room 208
Model reduction of geometrically exact structures formulated on the Lie group SE(3) <u>Valentin Sonneville</u> , Olivier Bruls	
A Reduction Method on Natural-coordinate Equivalent Constraints <u>Kewei Zhang</u>	
Simulation of Multibody Systems of Index 3 and Larger with the Software Package QUALIDAES <u>Andreas Steinbrecher</u>	

LUNCH

12:40 - 13:40

FLX 6 of 9 / Flexible Multibody Systems Session Chair : Ben Jonker, University of Twente Alexander A. Olshevskiy, Bryansk State Technical University	13:40 - 15:00 Room 201-2
Study on the Boundary Conditions considering Unwinding Velocity in Transient Unwinding Equations of Motion <u>Jin-Seok Jang</u> , Kun-Woo Kim, Jae-Wook Lee, Wan-Suk Yoo	
Three-Dimensional Solid Eight-node Element Using Slopes in the Absolute Nodal Coordinate Formulation <u>Alexander A. Olshevskiy</u> , Oleg N. Dmitrochenko, Chang-Wan Kim	
Influence of Deformation on the Rigid Body Motion in Flexible Multibody Dynamics <u>Morsli Ferhat</u> , Chettibi Taha and Bounab Belkacem	
VEH 7 of 12 / Dynamics of All Vehicles Session Chair : Tae oh Tak, Kangwon National University Enrico Meli, Florence University	13:40 - 15:00 Room 203
Study of High-Speed Train Dynamics under Degraded Adhesion Conditions: an Innovative HIL Architecture for Full-Scale Roller-Rigs KBenedetto Allotta, Roberto Conti, <u>Enrico Meli</u> , Luca Pugi, Alessandro Ridolfi	
Analysis of Passive Robot Mechanism for High Speed Driving on Rough Terrain <u>Young Jin Kim</u> , Jayoung Kim, Jihong Lee	
Study on the Improvement of Sign Detection System of Flange-Climb Derailment by MBD Simulation <u>Masaya Sakamoto</u> , Shihpin Lin, Yoshihiro Suda, Masahisa Kageyama, Shinichiro Koga, Takashi Kunimi, Tetsuya Kawanabe	
MEC 4 of 4 / Control and Mechatronics Session Chair : Ja Choon Koo, Sungkyunkwan University Wojciech Blajer, University of Technology and Humanities in Radom	13:40 - 15:00 Room 204
Mechatronic Device to Protect Against Falls during Locomotor Rehabilitation Sławomir Duda, Grzegorz Gembalczyk, Sławomir Kciuk, <u>Damian Gąsiorek</u>	
Dynamic modeling and analysis of a rescue robot for the real-time analysis <u>Tae-Yun Kim</u> , Samuel Jung, Wan-Suk Yoo	
On Modelling and Simulation of Dielectric Elastomer Actuators via Electrostatic-Elastodynamic Coupling T. Schlögl, <u>S. Leyendecker</u> , S. Reitelshöfer, M. Landgraf, I.S. Yoo, J. Franke	
Swimming Strategy for a Bio-inspired Legged Underwater Robot <u>Hee Joong Kim</u> , Bong-Huan Jun, Jihong Lee	
BIO 3 of 5 / Biomechanics Session Chair : Lulu Gong, Tongji University Andres Kecskemethy, University of Duisburg-Essen	13:40 - 15:00 Room 206
Preliminary study on cartilage contact modeling using flexible multibody approach <u>Adam Kłodowski</u>	
A Vibration Model of Seated Human Body in which Muscle Models are Employed <u>Young Nam Jo</u> , Moon Jeong Kang, Hong Hee Yoo	
Impact of the Forearm Modeling Refinement on the Upper Limb Joint Kinematics and Dynamics Maria Laitenberger, Mickael Begon, Guillaume Gaudet, Delphine Périé, Fabien Dal Maso, <u>Maxime Raison</u>	

OPT 5 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

Session Chair : Olivier Bruls, University of Liège
Jeong-han Lee, FunctionBay Inc.

13:40 - 15:00
Room 207

Parameter Estimation of a 6x6 Autonomous Vehicle
[Yeong-Jin Kim](#), Samuel Jung, Wan-Suk Yoo

Fully Symbolic Differentiation of Constrained Multibody Systems: Application to Vehicle Sensitivity Analysis
A. Poncelet, O. Brüls, [P. Fisette](#)

Damping Matrix Identification using Frequency Response Functions
[Cheon-hong Min](#), Hyung-woo Kim, Tae-kyeong Yeu, Jong-su Choi, Sup Hong

Robust Design of a Multibody System of an Automotive Vehicle
[A. Batou](#), C. K Choi, C. Soize, H. H. Yoo

CON 2 of 4 / Contact and Impact Problems

Session Chair : Jeong Hyun Sohn, Pukyong National University
Jochen Damerau, Bosch Corp

13:40 - 15:00
Room 208

Study on Contact Algorithm for ANCF on Multibody Dynamic System
Cheng Yang, Jiawei He, Gexue Ren, Masatsugu Monde, [Masataka Kawaguchi](#), Kensuke Nishiura

A Non-Linear Parametric Model Order Reduction Technique for Gear Contact Problems in Flexible Multibody Dynamics
[T. Tamarozzi](#), B. Blockmans, W. Desmet

The Development of Contact Algorithm for High-Speed Collision Simulation of an Active Protection System
[Jonghwan Won](#), Chulho Lee, Daesung Bae, Kyunghoon Song, Donghee Bae

Numerical Simulation of High-Velocity Impacts on Transparent Armor Structures
Daniel Huber, [Arash Ramezani](#), Hendrik Rothe

COFFEE BREAK

15:00 - 15:20

KEYNOTE / Jinyang Liu, Shanghai Jiao Tong University, China

Dynamic Modeling and Experiment Investigation of Rigid-flexible Coupling Multibody Systems

Session Chair : Ahmed Shabana, Univ. of Illinois at Chicago

15:20 - 16:00
Room 201-2

COFFEE BREAK

16:00 - 16:10

FLX 7 of 9 / Flexible Multibody Systems

Session Chair : Nobuyuki Kobayashi, Aoyama Gakuin University
Graham Sanborn, FunctionBay Inc.

16:10 - 17:50
Room 201-2

An MBD approach for a simplified yarn model
[Hidetoshi Takeuchi](#), Nobuyuki Shimizu

Coupled Analysis between Fluid and Multibody Dynamics for a Two-Dimensional Engine Nozzle
Wonjong Eun, Jaewon Kim, Junyoung Kwak, [SangJoon Shin](#), Oh-Joon Kwon, Oliver A. Bauchau

A GPU-based Preconditioned Newton-Krylov Solver for Flexible Multibody Dynamics
[Ang Li](#), Dan Melanz, Radu Serban, Dan Negrut

Dynamic Stiffness Improvement of Inspection Robot Frame using Multi-body Dynamic Simulation
[Jun Young Lee](#), Ji Youn Lim, Chang Hwan Kim, Hong Jae Yim

A Total Lagrangian Finite Element Approach for Computational Fluid Dynamics Based on Absolute Nodal Coordinates Formulation
Cheng Wei, Ahmed A. Shabana

VEH 8 of 12 / Dynamics of All Vehicles

Session Chair : Parviz Nikravesh, University of Arizona
Yoshihiro Suda, University of Tokyo

16:10 - 17:50
Room 203

Non-Singular Slip UA Tire Model Development in RecurDyn
[Jeong-han Lee](#), [Jin-hwan Choi](#), [Wan-suk Yoo](#)

Sample based Reliability Design of a Flexible Multibody System having Arbitrary Distributed Parameters
[C. K. Choi](#), [A. Batou](#), [C. Soize](#), [Hong Hee Yoo](#)

Development of an Analytical Model of a UTV with Consideration of the Chassis Static Stiffness, and Analysis of Driving Characteristics
[Sangcheol. Park](#), [Younmin. Song](#), [Kyunghun. Shin](#), [Seongkyu. Choi](#), [Jungwon. Park](#)

Responses of tire over several kinds of roads
[Chang-Gyu Yoon](#), [Sang-Do Na](#), [Dong-Woon Park](#), [Kwang-Suk Kim](#), [Wan-Suk Yoo](#)

An Electrical Vehicle Virtual Platform with Multibody Vehicle Model
[Sunwoo Kim](#), [Sung-Soo Kim](#)

EFF 1 of 4 / Efficient Methods and Real-Time Applications

Session Chair : Roland Pastorino, KU Leuven
Taichi Shiiba, Meiji University

16:10 - 17:50
Room 204

An Efficient Dynamics Analysis Method for Cylinder Driving Mechanical Arm System with multi-DOFs
[Bing Xu](#), [Maoke Liu](#), [Junhui Zhang](#), [Pengpeng Dong](#)

An Efficient Parametric Model Order Reduction Technique Applied to Bearing Force Estimation
[J. Fiszler](#), [T. Tamarozzi](#), [B. Blockmans](#), [B. Verreth](#), [W. Desmet](#)

A generalized component mode synthesis approach for global modal parameterization in flexible multibody dynamics
[A. Humer](#), [F. Naets](#), [W. Desmet](#), [J. Gerstmayr](#)

A partitioning method for parallelization of large systems in realtime
[Claude Lacoursière](#), [Fredrik Nordfeldth](#), [Mattias Linde](#)

A Parallel Algorithm For Multi-rigid Body System Dynamics Based On The Hamilton's Canonical Equations
[Paweł Malczyk](#), [Janusz Fraćzek](#), [Krzysztof Chadaj](#)

BIO 4 of 5 / Biomechanics

Session Chair : Paul Fiset, University catholique de Louvain
Yoshio Inoue, Kochi University of Technology

16:10 - 17:50
Room 206

Experimental Study on Coupling an Active Middle Ear Implant to the Round Window Membrane of the Cochlea
[P. Ziegler](#), [P. Wahl](#), [P. Eberhard](#)

In Vivo Determination of the Moment of Inertia of Limb Segments using a Dynamometer
[Jongsang Son](#), [Youngho Kim](#)

An EMG Driven Forward Dynamic Simulation of Sit-to-Stand
[Valerie T. Norman-Gerum](#), [John J. McPhee](#)

OPT 6 of 6 / Optimization, Sensitivity Analysis and Parameter Identification

16:10 - 17:50
Room 207

Session Chair : Javier Ros, Public University of Navarre
Jinyang Liu, Shanghai Jiao Tong University

Dynamic Responses Optimization of Vacuum Circuit Breaker using Taguchi Method
Jun Yeon Jo, Kil Young Ahn, Sung Tae Kim, Hong ik Yang, Kyu Jung Kim

Application of Extended Kalman Filter (EKF) Methodology for Parameter Identification in Structural Analysis of Three-Blade Wind Turbine
Fabio F. Real, Thiago G. Ritto

Identification of Dynamic Parameters of an Industrial Manipulator
Vishal Abhishek, Abdullah Aamir Hayat, Arun Dayal Udai, Subir Kumar Saha

MDA 1 of 1 / Multidisciplinary Approaches

16:10 - 17:50
Room 208

Session Chair : Hiroyuki Sugiyama, University of Iowa
Dae Sung Bae, Hanyang University

A Study on the Arrangement of Buoyancy Module for Stability of Marine Flexible Riser of a Deep-Seabed Mining System
Jae-won Oh, Cheon-hong Min, Hyung-woo Kim, Minuk Lee, Chang-ho Lee, Sup Hong, Dae-sung Bae

Dynamic analysis of a mini loader system coupled a hydraulic mechanism by using FMI
Joonyun Lim, Daesung Bae, Huije Cho, Kirang Kang, Younghwan Yoon

Analysis of Wind Turbine Drivetrain Dynamics under Wind Load and Axial Misalignment Uncertainties
Huaxia Li, Hiroyuki Sugiyama, Nicholas Gaul, KK Choi

Dynamic simulation and vibration control of solar cell substrate handling robot including FEM analysis
Dong Il Park, Cheolhoon Park, Doohyung Kim

Wednesday, July 2, 2014

KEYNOTE / Ja Kyum Koo, NVH-Korea, Korea

Investigation on the Missing Link between Multi-body System Dynamics and NVH

09:00 - 09:40
Room 201-2

Session Chair : Sung-Soo Kim, Chungnam National University

FLX 8 of 9 / Flexible Multibody Systems

Session Chair : Dan Negrut, University of Wisconsin Madison
Hiroyuki Sugiyama, University of Iowa

10:00 - 11:20
Room 201-2

Description of a Sliding Joint Between Flexible Bodies in the Floating Frame of Reference Formulation
[Sophie Zorn](#), Martin Jochmann, Ines Gubsch, Christian Schubert

Analysis of Impact Phenomena in a Vacuum Interrupter Considering Dynamic Material Properties
[Woo-Jin Park](#), Sung-Tae Kim, Kil-Young Ahn , Jong-Ho Lee

Frequency Analysis of Coilable Deployable Mast Based on Multibody Dynamic Approach
[Luning Li](#), Yongpeng Gu, Lihong Liu, Gexue Ren

Development of Structural Integrity Evaluation Analysis Model of Brake Caliper in considering Brake Conditions
[Kyunghun. Shin](#), Jungwon. Park, Sangcheol. Park, Younmin. Song, Seongkyu. Choi

BEN 1 of 2 / Benchmark Problems in Multibody System Dynamics

Session Chair : Javier Cuadrado, University of La Coruna
John McPhee, University of Waterloo

10:00 - 11:20
Room 203

A Comparison of DAE Integrators in the Context of Benchmark Problems for Flexible Multibody Dynamics
[Peter Betsch](#), Christian Becker, Marlon Franke, Yiping Yang

Validation of Flexible Multibody Dynamics Beam Formulations using Benchmark Problems
[Olivier A. Bauchau](#), Genyong Wu, Peter Betsch, Alberto Cardona, Johannes Gerstmayr, Ben Jonker, Pierangelo Masarati, Valentin Sonneville

An Update on the Web-based Library of Computational Benchmark Problems for Multibody Dynamics
Ramin Masoudi, Thomas Uchida, David Vilela, Alberto Luaces, [Javier Cuadrado](#), John McPhee

A Comparative Study on Effective Dynamic Modeling Methods for Flexible Pipe
[Chang-Ho Lee](#), Sup Hong, Hyung-Woo Kim, Jae-Won Oh, Hong-Seon Yun, Sung-Soo Kim

CON 3 of 4 / Contact and Impact Problems

Session Chair : Martin Arnold, Martin Luther University Halle-Wittenberg
Taewon Park, Ajou University

10:00 - 11:20
Room 204

A cylinder Intruder Colliding Against Granular Matter
Yong Pang, Caishan Liu, [Wenting Kang](#)

Application of 3D DEM Model to Lunar regolith Drilling Research
[Tianxi Liu](#), Cheng Wei, Liang Ma, Yang Zhao

Dynamic Simulation of Flexible Gear Pairs using a Contact Modelling between Superelements
[Geoffrey Virlez](#), Olivier Bruls, Emmanuel Tromme, Pierre Duysinx, Michel Geradin

Multi-Variable Method for Impact Dynamics of Flexible Multibody System
[Zhuyong Liu](#), Jiazhen Hong, Jianyao Wang

TCM 1 of 3 / Theoretical and Computational Methods		
Session Chair : Caishan Liu, Peking University Wojciech Blajer, University of Technology and Humanities in Ra-dom		10:00 - 11:20 Room 206
Numerical Investigation of Laminar Flow Over an Oscillating Circular Cylinder by an Unstructured-mesh ALE Finite-volume Method Xiaohui Su, Yao Cao, Zhao Yong		
FMM-based Pairwise Force Computation for Multibody-based Coarse-grain Molecular Simulations Jeremy J. Laflin , Kurt S. Anderson		
Numerical Integration of a Set of ODEs of Motion for Multibody Systems Sotirios Natsiavas, Elias Paraskevopoulos, Nikolaos Potosakis , Georgia Georgiou		
Optimal Control of Multibody Systems in terms of a Structure-Preserving Transcription Scheme C. Becker , P. Betsch		
ROT 1 of 3 / Dynamics of Machines and Rotating Structures		
Session Chair : Nobuyuki Shimizu, Iwaki Meisei University Feng Zengming, Jilin University		10:00 - 11:20 Room 207
The Blade Interaction Model Suitable for Nonlinear Simulations of Bladed Disks Michal Hajžman , Drahomír Rychecký		
Synchronization Configurations of Two Coupled Double Pendula Piotr Koluda, , Przemyslaw Perlikowski, Krzysztof Czolczynski, Tomasz Kapitaniak		
Quasi-Flexible-Body Gear Modeling Method for Gear Dynamic Transmission Error Estimation Sunggyu Cho , Juhwan Choi, Shigeru Horiuchi, Jin Hwan Choi		
ROB 5 of 6 / Robotic Systems		
Session Chair : Koichi Koganezawa, Tokai University Alberto Martini, University of Bologna		10:00 - 11:20 Room 208
Multi-Joint Gripper with Differential Gear Chain T. Tamamoto, K. Sayama, K. Koganezawa		
Multibody Model and Simulation of a Statically Balanced Parallel Kinematics Machine A. Martini , M. Troncosi, M. Carricato, A. Rivola		
Inverse Kinematic Solution of a 6-DOF(3-RPRS) Parallel Spatial Manipulator Vinoth Venkatesan , Yogesh Singh, Santhakumar Mohan		
Evaluation of Safety Index of 7-DOF Manipulator Considering Collision Safety Ki Hong Kim , In Jun Park, Sungsoo Rhim		
COFFEE BREAK		11:20 - 11:40
FLX 9 of 9 / Flexible Multibody Systems		
Session Chair : Aki Mikkola, Lappeenranta University of Technology Hong Hee Yoo, Hanyang University		11:40 - 12:40 Room 201-2
Flexible Multibody Simulation using Hybrid Integration Scheme Gibin Gil , Parviz E. Nikravesh		
Dynamics of Closed-Loop Rigid-Flexible Multibody Systems Using DeNOC Matrices Paramanand V. Nandiha , Subir K. Saha, Olivier A. Bauchau		
On a Consistent Derivation of a Set of ODEs of Motion for Multibody Dynamics Sotirios Natsiavas, Elias Paraskevopoulos		

EFF 2 of 4 / Efficient Methods and Real-Time Applications

Session Chair : Taichi Shiiba, Meiji University

Kurt Anderson, Rensselaer Polytechnic Institute

11:40 - 12:40
Room 203

Implementation Issues of an on Board Real-Time Multibody Model

Emilio Sanjurjo, Roland Pastorino, Pasquale Gallo, Miguel A. Naya

Research on Performance and Fail-safety Evaluation of EHPS System using Realtime Test Method

KyungHoon Lee, Hyungjeon Choi, Seungyeol Yoon, Dongseob Song

Real-Time Simulation of Rigid Body System Driven by Linear Elements

Kei Morita, Etsujiro Imanishi, Takao Nanjo, Takeshi Fujikawa

BIO 5 of 5 / Biomechanics

Session Chair : Josep Font-Llagunes, Universitat Politècnica de Catalunya

Sungsoo Rhim, Kyung Hee University

11:40 - 12:40
Room 204

Forward Dynamics of Human Gait based on Control Techniques

Rosa Pàmies-Vilà, Josep M. Font-Llagunes, Urbano Lúgrís, Javier Cuadrado

The Effect of Swing Pattern on the Release Point and the Club Head Speed

Zhiwei Li, Shunta. Kodama, Yoshio. Inoue, Kyoko. Shibata

The Comparative Study of Cognitive and non-cognitive Loads on Muscles in the Multi-body Model for the Analysis of Whiplash

Younghak Lee, Kijung Kim, Young-Wook Kim, Seok-Chan Kim, Seok-Jo Yang

TCM 2 of 3 / Theoretical and Computational Methods

Session Chair : Olivier Bruls, University of Liège

Nobuyuki Kobayashi, Aoyama Gakuin University

11:40 - 12:40
Room 206

On the Role of Quadrature Rules and System Dimensions in Variational Multirate Integrators

Tobias Gail, Sigrid Leyendecker, Sina Ober-Blöbaum

Multibody System Description by a Symbolic Language

Oleg N. Dmitrochenko, Marko K. Matikainen, Aki M. Mikkola

Reduction of System Matrices of Plate in Absolute Nodal Coordinate Formulation by Component Mode Synthesis Method

Naoto WATANABE, Yuya OKAZAWA, Nobuyuki KOBAYASHI, Yoshiki SUGAWARA, Ayako TORISAKA

ROT 2 of 3 / Dynamics of Machines and Rotating Structures

Session Chair : Nobuyuki Shimizu, Iwaki Meisei University

Feng Zengming, Jilin University

11:40 - 12:40
Room 207

Two Approaches to the Dynamics of Bladed Disks

Pavel Polach, Michal Hajžman

Dynamic Analysis of a Rotating Axially Functionally Graded Tapered Beam Mounted on a Rigid Hub

Liang Li, Dingguo Zhang, Jianshi Fang

Dynamic Simulation of Control Rod Drive Actuator in the SMART Nuclear Reactor

Myounggyu D. Noh, Myung Ju Gi, Myounggon Kim, Young-Woo Park, Jaeseon Leey, Jong-Wook Kim

VEH 9 of 12 / Dynamics of All Vehicles

Session Chair : Werner Schiehlen, Universität Stuttgart
Hiroyuki Sugiyama, University of Iowa

11:40 - 12:40
Room 208

Critical Speed Change of Railway Vehicle by Using MR Damper for Secondary Suspension with Skyhook Control
Wonhee You, Yujeong Shin, Hyunmoo Hur, [Nampo Kim](#)

The Review of the Method of the Running Safety Assessment for the High-Speed Railway
[Sang-Soo Kim](#), Sanghyun Ryu, Hongsik Jo, Heemin Noh, Choonsoo Park

LUNCH

12:40 - 13:40

Excursion - Gyeongju Cultural Heritage Tour

14:00 - 18:30

Conference Banquet - Hotel Hyundai Gyeongju

18:30 - 23:00

Thursday, July 3, 2014

KEYNOTE / Andres Kecskemethy, University of Duisburg-Essen, Germany **Generation of Minimal Coordinate Formulations in Multibody Applications**

09:00 - 09:40
Room 201-2

Session Chair : Peter Eberhard, University of Stuttgart

BEN 2 of 2 / Benchmark Problems in Multibody System Dynamics

10:00 - 11:20
Room 201-2

Session Chair : Jin Hwan Choi, Kyung Hee University
Javier Cuadrado, University of La Coruna

Benchmark Problems for Contact Dynamics in Multibody Systems
[Ramin Masoudi](#), Paulo Flores, John McPhee

A Bouncing Ball Benchmark Problem and Solution of An Ellipsoid-to-Plane Contact
[Jan Špička](#), Michal Hajžman, Luděk Hynčík, Pavel Polach

Dynamic Analysis of Benchmark Problems Using the DeNOC Matrices
[Anil Kumar Sharma](#), Suril V. Shah, Subir Kumar Saha

Benchmark Problems from Vehicle Dynamics
[Werner Schiehlen](#)

TCM 3 of 3 / Theoretical and Computational Methods

10:00 - 11:20
Room 203

Session Chair : Nobuyuki Kobayashi, Aoyama Gakuin University
Caishan Liu, Peking University

Minimal Extension for Mechanical Systems with Control Constraints
[Robert Altmann](#), Peter Betsch, Yinping Yang

Structural Dynamic Response Analysis of Spar Floating Offshore Wind Turbine subject to Wave-Induced Excitation by Semi-Analytical Numerical Approach
[Jin-Rae Cho](#), Bo-Sung Kim, Eun-Ho. Choi, Shi-Bok Lee, O-Kaung Lim

Convergence of Generalized- α Time Integration for Nonlinear Systems with Stiff Potential Forces
[Markus A. Köbis](#), Martin Arnold

VEH 10 of 12 / Dynamics of All Vehicles

10:00 - 11:20
Room 204

Session Chair : Yoshihiro Suda, University of Tokyo
Zhuyong Liu, Shanghai Jiao Tong University

Physically-Oriented Modeling and Simulation of the Omni Vehicle Dynamics
[Ivan I. Kosenko](#), Kirill V. Gerasimov

An Investigation on Tractor Pitch Resonance : Simulations and Tests
[Jungkyum Yu](#), Kwangseok Oh, Donghoon Shin, Jiwon Yoon, Kyongsu Yi

Torque Distribution of the Three-Wheeled Vehicle with Rear-Wheel Steering and Skid Steering
Jaehoon Sim, [Myungju Ryu](#), Youngjin Park

OTH 5 of 8 / Multibody Applications, Experiments and Other Topics

Session Chair : Etsujiro Imanishi, KOBE STEEL, LTD.
Ja Choon Koo, Sungkyunkwan University

10:00 - 11:20
Room 206

Experimental Validation of Friction Force for the Spring Operating Mechanism in a Circuit Breaker
Hyunwoo Kim, Byungtae Bae, Sungho Lee, Jooeon Park, Jaeyeol Kim, Jinho Kim

Hammering beneath the surface of Mars - Forensic engineering of failures in the HP3-Mole by applying multi-body dynamics simulation
Roy Lichtenheldt, Bernd Schäfer, Olaf Krömer, Tim van Zoest

Modeling and Dynamics Analysis of a Rotary Compressor
Seungmin Kwon, Hong Hee Yoo, Youngboo Son, Jonghun Ha

A Simulation Based Approach to Study How Powder Shape Influences The Selective Laser Sintering Process
H. Mazhar, J. Bollmann, E. Forti, A. Praeger, T. Osswald, D. Negrut

OTH 6 of 8 / Multibody Applications, Experiments and Other Topics

Session Chair : Aki Mikkola, Lappeenranta University of Technology
Jinyang Liu, Shanghai Jiao Tong University

10:00 - 11:20
Room 207

The Study on the Dynamic Characteristics of Ultra High Speed VCB using Electro Magnetic Actuator
Dong Sik Lee, Hyun Wook Lee, Hong Ik Yang, Kil Young Ahn, Jhong Ho Lee

Dynamic Analysis of a Washing Machine with a Rapid Decrease of Unbalanced Mass during Hydration Process
Min Hyung Cho, Jin Seok Jang, Jae Hoon Jin, Wan Suk Yoo, Gyung Hun Nho, Jin Hong Park, Bo Sun Chung, Youn Su Jung

Multibody Dynamics as a Historical Tool: Study of an 18th Century Piano Action of Andreas Stein
Baudouin Boklaey, Anne-Emmanuelle Ceulemans, Paul Fisette

Effective 2D Roll-to-Roll System Analysis Method using Approximated Winding Length Estimation Algorithm
Sungham Hong, Juhwan Choi, Jin Hwan Choi

EFF 3 of 4 / Efficient Methods and Real-Time Applications

Session Chair : Kurt Anderson, Rensselaer Polytechnic Institute
Frank Naets, KU Leuven

10:00 - 11:20
Room 208

Parallel Processing with the Subsystem Synthesis Method for Efficient Vehicle Analysis
HeeChan Kang, Sung-Soo Kim

Towards Real-time Multibody Simulations using ARM-based Embedded Systems
Roland Pastorino, Francesco Cosco, Frank Naets, Javier Cuadrado, Wim Desmet

Real-time Vehicle Dynamics Analysis by the Generalized-a Scheme with Fixed Iteration Matrix
Taichi Shiiba, Takumi Motosugi

COFFEE BREAK

11:20 - 11:40

VEH 12 of 12 / Dynamics of All Vehicles

Session Chair : Hyung-Suk Han, Korea Institute of Machinery and Materials
Parviz Nikravesh, University of Arizona

11:40 - 12:40
Room 201-2

Transfer Path Analysis with OPAX and OPA in a Dummy Car
Jong Sik Kim, Sang Kwon Lee

Vibration Characteristics Analysis of an Agricultural Tractor and Development of Performance Evaluation Method
Chanho Choi, Ji Won Yoon, Jai Yoon Shin, Kyuug seok Min, Kyongsu Yi

Study of the Aerodynamic Interference between the Airships of the MAAT System during Approach
Anna Suñol, [Dean Vucinic](#), Paolo Geremia, Francisco Campos

ROT 3 of 3 / Dynamics of Machines and Rotating Structures

Session Chair : Nobuyuki Shimizu, Iwaki Meisei University
Jin Hwan Choi, Kyung Hee University

11:40 - 12:40
Room 203

Nonlinear Multi-body Dynamics of a Wind Turbine System
[Thiago G. Ritto](#), Fabio F. Real, Felipe G. Gonzaga

Estimation of the Vibration Fields of a Reciprocal Compressor using Advanced Modal Expansion Method
Byung Kyoo Jung, Weui Bong Jeong, [Kyeong Won Bae](#)

Dynamic Modeling and Stability Analysis of a Rotating Internal Cantilever Beam with Tip-Mass
[Jianshi Fang](#), Dingguo Zhang

VEH 11 of 12 / Dynamics of All Vehicles

Session Chair : Jorge Ambrosio, Instituto Superior Tecnico
Tae oh Tak, Kangwon National University

11:40 - 12:40
Room 204

Response Characteristics of Leaf Spring Models Driving on a Sinusoidal Road

[Chi-Young Ryu](#), Jin-Seok Jang, Kwang-Suk Kim, Jong-Tak Song, Do-Kyung Kang, Byoung-Yong Lee, Wan-Suk Yoo

Modeling of Rubber Bush for Real-time Simulation

[Kiyosuke Takekoshi](#), Yusuke Abe, Takumi Motosugi, Taichi Shiiba

Model Based Active Damper Control System using Motorized Damper and its Pilot Application

[Dae Jun. Kang](#), Min Su. Park, Hyung Jin. Choi, Ki Han . No

OTH 7 of 8 / Multibody Applications, Experiments and Other Topics

Session Chair : Etsujiro Imanishi, KOBE STEEL, LTD.
Wan Suk Yoo, Pusan National University

11:40 - 12:40
Room 206

Unified Mechanism Synthesis of Planar Four-bar Linkage Mechanism using 3 Bushing Points Model

[Jung Ryeol Hong](#), Hong Hee Yoo

Multibody Dynamics Simulation for Occiput Impact during Falling Backward in Judo

[M. Omiya](#), R. Suzuki, T. Kamitani, H. Hoshino

Robust Design Methodology for the System Subject to the Shooting

[Jaeyoon Choi](#), Younghun Kim, Samson Yoon, Jaehwan Lee, Yeogiel Yoon, Shiyang Ryu, Hong J. Yim

OTH 8 of 8 / Multibody Applications, Experiments and Other Topics

Session Chair : Roland Pastorino, KU Leuven
Dae Sung Bae, Hanyang University

11:40 - 12:40
Room 207

Estimation Method for the Design of a Driving System of 4-High Mill using Multivariate Interpolation Method

[Lin Liu](#), Chenggen Li, Daesung Bae, Kyunghoon Song, Huije Cho, Changho Moon, Sungjin Lee

A Method for Modelling Normal Reaction Forces between Wheel and Soft Terrain for Planetary Exploration Rovers

[Francisco González](#), Bahareh Ghotbi, József Kövecses, Jorge Angeles

Study of Main Influence Parameters on the Hysteresis Characteristics of the Damper Spring in Torque Converter System and Modeling Automation

[Hyochan Jun](#), Wangoo Kim, Sunsuk Hong, Wan Choi, Woohyeon Jeoung, Daesung Bae

EFF 4 of 4 / Efficient Methods and Real-Time Applications

Session Chair : Kurt Anderson, Rensselaer Polytechnic Institute
Joon-Shik Yoon, FunctionBay Inc.

11:40 - 12:40
Room 208

Towards Benchmarking of State Estimators for Multibody Dynamics

José-Luis Torres, José-Luis Blanco, Emilio Sanjurjo, Miguel-Ángel Naya, Antonio Giménez

Logarithmic Complexity Large Deformation Formulation using Absolute Nodal Coordinate Beam and Plate Elements

Imad M. Khan, Kurt S. Anderson

Experimental Input Force Estimation using Large-Deformation Flexible Multibody Simulation

F. Naets, F. Cosco, T. Tamarozzi, W. Desmet

LUNCH

12:40 - 13:40

KEYNOTE / Yoshiaki Terumichi, Sophia University, Japan

A Systematic Approach of Numerical Simulation and Experiments Applied for the Study on the Railway Vehicle Dynamics on Large Earthquake

13:40 - 14:20
Room 201-2

Session Chair : Olivier Bauchau, University of Michigan-Shanghai Jiao Tong University Joint Institute

CLOSING CEREMONY

14:20 - 15:00
Room 201-2