

Rolling Contact Mechanics for Multibody System Dynamics

10 April – 13 April 2017, Madeira, Portugal

Welcome

On behalf of the organizers of the EUROMECH Colloquium 578 on Rolling Contact Mechanics for Multibody System Dynamics we are pleased to welcome you to Funchal for this event.

The main goal of the EUROMECH Colloquium is to bring together scientific experts in the different areas that contribute to the Rolling Contact Mechanics, evaluate the State-of-the-Art, identify the shortcomings and opportunities for research, and promote the interaction between leading scientists, young researchers and industrial experts. The Colloquium will address scientific topics that contribute to the mechanical and computational challenges to handle rolling contact mechanics in the context of multibody dynamics. The reviewing of the classic theories in elastic and plastic contact, the computational algorithms for their efficient use in the framework of multibody dynamics applications, the tribology aspects characteristic of many of the mechanical systems of interest, the consequences of wear both in the response of the system and in the use of the background contact theories are just some of the aspects of relevance that justify a close look.

We invite you to be an active participant in this Colloquium and to contribute to any topic of your scientific interest. By promoting a relaxed atmosphere for discussion and exchange of ideas we expect that new paths for research are stimulated and promoted and that new collaborations can be fostered. We hope that the EUROMECH Colloquium 578 on Rolling Contact Mechanics for Multibody System Dynamics will have an important impact on the research in all topics included in its programme.

We want to express our appreciation to all members of the Scientific Committee involved in the preparation of this Colloquium and the selection of contributors, to Mrs. Paula Jorge who managed its different aspects, and to all the contributing authors and participants who will support the forthcoming Colloquium. We hope that all of you feel rewarded for your participation and contribution, and that you may refer to it in the future as being an important event in the development of the scientific areas addressed.

Yours Sincerely,

Jorge Ambrósio • Instituto Superior Técnico, University of Lisbon, Portugal

Werner Schiehlen • University of Stuttgart, Germany

João Pombo • Heriot-Watt University, United Kingdom



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Scientific Programme

Final Schedule of EUROMECH Colloquium 578 on Rolling Contact Mechanics				
Time	Monday April 10	Tuesday April 11	Wednesday April 12	Thursday April 13
08:00				
09:00		Session 03 ID: 70, 38, 19, 56, 62	All Day Tour	Session 07 ID: 69, 34, 67, 68, 09
10:00		Coffee Break		Coffee Break
11:00		Session 04 ID: 42,45,53,15,35,55		Session 08 ID: 24,13,05,33,61,31
12:00				
13:00	Registration at VidaMar Hotel	Lunch at VidaMar Hotel		Lunch at VidaMar Hotel
14:00	Open Cerimony and Session 1 ID: 47, 04, 18, 29	Session 05 ID: 63,41,17,25,57,36		Session 09 ID: 30, 21, 52, 22
15:00	Coffee Break	Coffee Break		Farewell Drink
16:00	Session 02 ID: 01,03,40,10,32,51	Session 06 ID: 32, 12, 16, 44, 26		
17:00				
18:00				
19:00				
20:00			Banquet	
21:00				
22:00				
23:00				

Times are approximate (see detailed programme for exact schedule)

Note 1: In the 'Programme at a glance' the ID of the presentations corresponds to the ID of the submission. See the detailed programme, in the next pages, for the authors names and presenting author of each presentation.

Note 2: The times for the events listed in the programme at a glance are approximate and subjected to slight adjustments.

Session - 01 - Monday, April 10 - 14:00 - 15:40			Session Chair: João Pombo
Time	ID	Authors (Presenting)	Title
14:00		Opening Session	
14:20	47	Werner Schiehlen	A Short History of Contact Mechanics, Rolling Contact and Multibody System Dynamics
14:40	4	Edwin Vollebregt	Current understanding of the creep phenomenon
15:00	18	Katharina Babilon , Amir Moshiri-Kahak and Raphael Pfaff	Analytical modelling of friction enhancers for wheel-rail contact
15:20	29	Klaus Six , Alexander Meierhofer, Gerald Trummer, Bettina Suhr and Martin Rosenberger	Tribology in Wheel-Rail Contact and Cross Connections to Tyre-Road Phenomena
Session - 02 - Monday, April 10 - 16:00 - 18:00			Session Chair: Paulo Flores
Time	ID	Authors (Presenting)	Title
16:00	1	Georg Rill	Sophisticated but quite simple contact calculation for handling tire models
16:20	3	Walter V. Wedig	Multi-Body Vehicle Systems Rolling on Road Profiles - Velocity Transformations from Way to Time Domain
16:40	40	Ryo Kikuuwe and Kahhaw Hoo	A Viscoelastic Tyre Friction Model Based on A Partial Differential-Algebraic Inclusion
17:00	10	Laura Costa, Christophe Perrin and Thierry Serre	Using of Pacejka tire model within a Powered Two-Wheelers multibody model for emergency situations analysis
17:20	2	Johannes Masino, Benjamin Wohnhas, Michael Frev and Frank Gauterin	Identification and prediction of road features and their contribution on tire road noise
17:40	51	Florian Potra	Complementarity problems and multibody dynamics with contacts, joints, and friction
Session - 03 - Tuesday, April 11 - 09:00 - 10:40			Session Chair: Stefano Bruni
Time	ID	Authors (Presenting)	Title
09:00	70	Jan Awrejcewicz and Grzegorz Kudra	Rolling Resistance Modelling in the Celtic Stone Dynamics
09:20	38	Michal Kráčačík , Werner Daves and Stephan Scheriau	Crack growth assessment in rolling/sliding contact
09:40	19	Ivan Kosenko , Sergey Stepanov and Kirill Gerasimov	Contact Tracking Algorithms in Case of the Omni-Directional Wheel Rolling on the Horizontal Surface
10:00	56	Stephen Lewis , Dirk Engelberg, Shaun Earl, Aditya Narayanan, David Fletcher, et al.	Full-Scale Testing of Laser Clad Rail Track; Part II - Results of Sub-Surface Microstructural, Micro-Hardness and Residual Stress Analysis
10:20	62	Filipe Marques , Paulo Flores, José Carlos Pimenta Claro and Hamid M Lankarani	Modeling and analysis of friction effects in multibody dynamics

Session - 04 - Tuesday, April 11 - 11:00 - 13:00			Session Chair: Werner Schiehlen
Time	ID	Authors (Presenting)	Title
11:00	42	<u>Stefano Bruni</u> , Jerzy Piotrowski and Binbin Liu	A Fast Method For Determination of Creep Forces in Non-Hertzian Contact of Wheel and Rail Based on a Book of Tables
11:20	45	<u>Hugues Chollet</u>	From semi-Hertzian to equivalent contact models in a Simulink multibody environment
11:40	53	<u>Julio Blanco-Lorenzo</u> , Javier Santamaria, Ernesto G. Vadillo and Nekane Correa	Characteristics of Wheel-Rail Conformal Rolling Contact
12:00	15	José L. Escalona and <u>Javier F. Aceituno</u>	Accuracy and computational efficiency of railway multibody models with contact lookup tables
12:20	35	<u>Pedro Antunes</u> , <u>Hugo Magalhães</u> , <u>Jorge Ambrosio</u> , <u>João Pombo</u> and <u>Joao Costa</u>	A co-simulation approach to the rail-wheel contact with flexible railways
12:40	55	<u>Philippe Kwassi Amuzuga</u> and Daniel Nelias	Damage mechanism related to plasticity around heterogeneous inclusions under rolling contact loading
Session - 05 - Tuesday, April 11 - 14:00 - 16:00			Session Chair: Arend Schwab
Time	ID	Authors (Presenting)	Title
14:00	63	<u>Timo Kiekbusch</u> and Bernd Sauer	Calculation of the dynamic behavior of rolling bearings with detailed contact calculations
14:20	41	<u>Iker Heras</u> , Josu Aguirrebeitia, Mikel Abasolo and Joseba Albizuri	Simplification of four contact point slewing bearings for multibody simulations
14:40	17	<u>Dmitry Vlasenko</u>	Dynamical simulation of rolling bearings with elastic parts in CABA3D
15:00	25	<u>Leoluca Scurria</u> , Jakob Fiszer, Tommaso Tamarozzi, Pavel Jiranek and Wim Desmet	An Advanced Modeling Technique for Rolling Element Bearings in Elasto-hydrodynamic Lubrication (EHL) Field
15:20	57	<u>A. Diez-Ibarbia</u> , A. Fernandez-Del-Rincon, A. De-Juan, M. Iglesias, P. Garcia and F. Viadero	Friction Coefficient Role on Efficiency of Spur Gears With Reliefs
15:40	36	<u>Paulo Flores</u> and Filipe Marques	Combined effects of elastic deformation and lubrication action in human knee joints
Session - 06 - Tuesday, April 11 - 16:20 - 18:00			Session Chair: Georg Rill
Time	ID	Authors (Presenting)	Title
16:20	32	<u>Arend Schwab</u> and Jaap Meijaard	A linear tyre model for bicycle handling evaluation
16:40	12	<u>Sandor Beregi</u> and <u>Denes Takacs</u>	Analysis of the tyre-road interaction with a non-smooth delayed contact model
17:00	16	<u>Ye Zhuang</u> , Chengwei Zhu and Yong Wang	Experimental Observation on Tyre Tread Rubber Normal Contact Hysteresis
17:20	44	Michael Roller, <u>Joachim Linn</u> , Axel Gallrein and Peter Betsch	A tire model based on geometrically exact shells for modal analysis in steady state rolling
17:40	26	Ye Zhuang, Xueliang Gao and <u>Yong Wang</u>	Influence of the Tire Damping to the Tire-road Vertical Contact Dynamics

Session - 07 - Thursday, April 13 - 9:00 - 10:40		Session Chair: Jan Awrejcewicz	
Time	ID	Authors (Presenting)	Title
09:00	69	Ilya I. Kudish, Sergey S. Volkov, Andrey S. Vasiliev and <u>Sergey M. Aizikovich</u>	Coating Behavior in Heavily Loaded Lubricated Contacts
09:20	34	<u>Jorge Ambrosio</u> , Marisa Lima and Gil Santos	Multibody Modelling and Dynamic Analysis of Tapered Roller Bearings
09:40	67	<u>Chin-Chung Wei</u>	Kinetic and contacting analyses of multi-cycles preloaded ball-screw
10:00	68	<u>Farid Al-Bender</u>	Application of a transient rolling-contact model to the dynamics of elastic ball-plane/v-groove contact
10:20	9	<u>Vladimir Poliakov</u>	Interaction Optimization in Bridge-Track-Car System
Session - 08 - Thursday, April 13 - 11:00 - 13:00		Session Chair: Edwin Vollebregt	
Time	ID	Authors (Presenting)	Title
11:00	24	<u>Reinhold Meisinger</u>	Review of the Development of the Creep-Controlled Wheelset for High-Speed Railway Vehicles
11:20	13	<u>Michael Beiteltschmidt</u> , Sten Urban and Bernhard Peters	Wear in Rolling Contact of Railway Wheels with Water and Ice in the Contact Zone
11:40	5	<u>Florian Doerner</u> and Christian Schindler	Influence of the rolling resistance on the pressure distribution of the wheel rail contact
12:00	33	<u>Jan Kalivoda</u>	Simulation of a sharp curved track on a roller rig
12:20	61	<u>Tomasz Staskiewicz</u> , Bartosz Firlik and Wojciech Jaskowski	On developing a tram new wheel profile using multibody simulation tools
12:40	31	<u>Fernando Isaac</u> , Filipe Marques, Nuno Dourado and Paulo Flores	Modelling of Spatial Mechanical Joints with Realistic Properties: A Finite Element Analysis
Session - 09 - Thursday, April 13 - 14:00 - 15:40		Session Chair: Jorge Ambrósio	
Time	ID	Authors (Presenting)	Title
14:00	30	<u>Volkert van der Wijk</u>	Inherent dynamic balancing of linkages with rolling joints
14:20	21	<u>C.D. Van der Wekken</u> , E.A.H. Vollebregt and C. Vuiik	Occurrence and removal of wiggles in transient rolling contact simulation.
14:40	52	<u>Umut Hanoglu</u> and Bozidar Sarler	Implementation of the Interaction Between the Billet and the Roll in a Meshless Based Hot Rolling Simulation
15:00	22	<u>Alexandra Zobova</u>	Dry Friction Distributed over a Contact Patch Between a Rigid Body and a Visco-Elastic Plane.
15:20		Closing Session	