

IMSD-ACMD (Oct 16-20, 2022): Tentative Program (updated on Sept 19, 2022): Time mentioned is Indian Standard Time (IST) which is GMT +05:30 hours

Time	Oct 16 (S)	Oct 17 (M)				Oct 18 (T)				Oct 19 (W)				Oct 20 (Th)					
		Common								Common								Common	
		Track A		Track B		Track A		Track B		Track A		Track B		Common					
08:40	09:00	Inauguration																	
09:00	09:20	Keynote 1: Radu Serban				Keynote 3: Shankar Venugopal				Keynote 5: Etsujiro Imanishi				Social Program* 1. Depart Delhi at 07:00 2. Visit Taj Mahal at Agra 3. Return to Delhi by 17:30					
09:20	09:40	Topic: Modeling and Simulation of Terramechanics and Vehicle-soil Interaction				Topic: A System dynamics approach to shaping future mobility technologies				Topic: Dynamics performance prediction on construction machinery									
09:40	10:00		25 (KR)		42 (JP)		110 (IN)		190 (US)		182 (KR)		139 (IN)						
10:00	10:20	FLX1	179 (KR)	APP1	85	BIO1	16 (IN)	DYN1	224 (JP)	COMP2	45 (KR)	MEC1	191 (IN)						
10:20	10:40		194 (JP)		192		93		88 (JP)		197 (KR)		17						
10:40	11:00		209		227		130		198		66		18						
11:00	11:20		87		175 (IN)		186		72		177		111						
11:20	11:40	Tea/Coffee				Tea/Coffee				Tea/Coffee									
11:40	12:00		81		214		83 (ES)		114		166		220						
12:00	12:20	FLX2	75	APP2	215	BIO2	216 (IN)	COMP1	199 (AT)	DYN2	102	MEC2	76						
12:20	12:40		28 (DE)		184 (ES)		132 (DE)		173 (ES)		181 (KR)		168 (IN)						
12:40	13:00		193 (DE)		204 (AT)	Industry Session					223 (AT)		29 (NL)						
13:00	13:20		119		136								188 (DE)						
13:20	13:40	Lunch				Lunch				Lunch									
13:40	14:00																		
14:00	14:20	Track A		Track B		Track A		Track B		Track A		Track B							
14:20	14:40	Keynote 2: Robert Seifried				Keynote 4: Alberto Cardona				149		176							
14:40	15:00	Topic: Servo-Constraints – An elegant way of inverting under-actuated and flexible multibody system models				Topic: Simulation of wind turbines with full fluid/structure interaction and deforming blades				MOD2	77	APP3	226						
15:00	15:20		30 (ES)		15 (DE)		200		195 (DE)		22 (JP)		23 (ES)						
15:20	15:40		67 (IN)		222		183 (ES)		34 (IN)		74		103 (IN)						
15:40	16:00	BEN	219	OPT	203	CON	112	MOD1	145 (IN)	MBD	165	SOC	167						
16:00	16:20		171		180		211 (IN)		221		104		121						
16:20	16:40	Industry Session					96 (IN)		54 (IN)		189		106						
16:40	17:00						201 (US)		131		125		11						
17:00	17:20	Tea/Coffee				Tea/Coffee				Tea/Coffee									
17:20	17:40	Registration and Welcome Reception Social Program and Banquet Dinner*																	
17:40	18:00																		
18:00	18:20																		
18:20	18:40																		
18:40	19:00																		
19:00	19:20																		
19:20	19:40	Keynote 6/7: Hao Wang																	
19:40	20:00	Topic: New type of robotic manipulators with large deformation flexible linkage																	
Closing Ceremony and High Tea																			

* Only for "Full" category registration and for those who have paid "Additional Fee for Taj Mahal visit" and/or "Additional Fee for Banquet"

Online participants

AT: Austria
 DE: Germany
 ES: Spain
 IN: India
 JP: Japan
 KR: South Korea
 NL: Netherlands
 US: United States

Session No

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10
11
12

Code

BIO
APP
BEN
COMP
CON
MEC
DYN
FLX
MOD
MBD
SOC
OPT

Session Name

Biomechanics
 Applications, Multidisciplinary Methods, and Other Topics
 Benchmark Problems in Multibody System Dynamics
 Computational Methods and Real-Time Applications
 Contact, Impact, and Constraints
 Control, Mechatronics, and Robotics
 Dynamics of Vehicles
 Flexible Multibody Systems
 Modelling, Formalisms, and Theoretical Methods
 Multibody Kinematics
 MBD for Social Applications
 Optimization, Sensitivity Analysis, and Parameter Identification

Paper ID	Session Code	Session Name	Paper Title	Authors
11	SOC	MBD for Social Applications	Heads-up Display based on the Real-time Multibody Simulation of a Tractor	Suraj Jaiswal, Rafael Åman, Jussi Sopanen, Aki Mikkola
15	OPT	Optimization, Sensitivity Analysis, and Parameter Identification	Application of Model Updating on the Numerical Model of a Classical Guitar with Identified Parameters from Experimental Modal Analysis	Alexander Brauchler, Pascal Ziegler, Peter Eberhard
16	BIO1	Biomechanics	Experimental biodynamic investigation on vibrational exposure of human body during a vehicle ride	Raj Desai, Anirban Guha, P. Seshu
17	MEC1	Control, Mechatronics, and Robotics	SAKSHAM: A WebGL/WebHID Based Framework for Creating a Digital Twin System for Virtual Robotics Labs	Ashish Siddharth, Arun Udai
18	MEC1	Control, Mechatronics, and Robotics	Design and Control of All Pneumatic Virtual Motion Simulator	Arun Udai, Ashish Siddharth, Sourabh Khemka
22	MBD	Multibody Kinematics	Kinematic/Kinetic Formulation and Simulation Study for Hyper-Redundant Continuum Robot	Azamat Yeshmukhametov, Yoshio Yamamoto, Koichi Koganezawa
23	SOC	MBD for Social Applications	Case study on fatigue damage due to dynamic effects in a revolute joint with clearance and wear	Manuel Ordiz, Javier Cuadrado, Mario Cabello, Iban Retolaza, Daniel Dopico
25	FLX1	Flexible Multibody Systems	The Flexible Web Gear Modeling and Analysis Method for Efficient Gear Web Shape Design	Sunggyu Cho, Joonshik Yoon, Juhwan Choi, Jin-Gyun Kim, JIN HWAN CHOI
28	FLX2	Flexible Multibody Systems	Design Tools for Particle Dampers for Flexible Multibody Systems	Niklas Meyer, Robert Seifried
29	MEC2	Control, Mechatronics, and Robotics	Sensorless force control with a Disturbance Observer for a compliant manipulator	Ronald Aarts, Wouter Hakvoort
30	BEN	Benchmark Problems in Multibody System Dynamics	Monitoring Energy Errors in Explicit Co-Simulation Setups	Borja Rodríguez, Alejandro Zar, Francisco Gonzalez, Miguel A. Naya, Javier Cuadrado
34	MOD	Modelling, Formalisms, and Theoretical Methods	Estimation of Positional Error in Five-bar Manipulator under the Influence of Tolerances	Ankur Jaiswal, H. P. Jawale
42	APP1	Applications, Multidisciplinary Methods, and Other Topics	Contact analysis of slit at inlet of mobility device utilizing tether extension and winding	Satoshi Takayama, Shoichiro Takehara, KAZUKI NIRAYAMA
45	COMP2	Computational Methods and Real-Time Applications	A Study of Deep Neural Network based Data-driven Modeling for Real-time Flexible Multibody Dynamics Simulation	Seongji Han, Hee-sun Choi, Juhwan Choi, JIN HWAN CHOI, Jin-Gyun Kim

54	MOD	Modelling, Formalisms, and Theoretical Methods	DeNOC Based Dynamic Modelling Approach of Planar Closed Loop Robotic Mechanism	RUTUPURNA CHOUDHURY, Deep Singh, Yogesh Singh
66	COMP2	Computational Methods and Real-Time Applications	Synchronization and Scalability of the Multi-Agent Dynamics Environment SynChrono	Jay Taves, Asher Elmquist, Alexandra Kissel, Radu Serban, Dan Negrut
67	BEN	Benchmark Problems in Multibody System Dynamics	Modelling and diagnosis of defects in spur gear under constant speed operation	Rajeev Kumar, Ranjan Gouda, Samrat Mandal, Chintamani Mishra
72	DYN1	Dynamics of Vehicles	Multibody model of railway wheelset using Natural Orthogonal Compliments	S Vishnu, Satinder Paul Singh, Subir Kumar Saha
74	MBD	Multibody Kinematics	Determination of Point of Contact for Cone-Line and Cone-Cylinder Primitives using Denavit-Hartenberg (DH) Parameters	Rajeevlochana Chittawadigi, Subir Kumar Saha
75	FLX2	Flexible Multibody Systems	A recursive simulation algorithm for soft robotics	Makoto Iwamura, Yoshiki Maeda, Kodai Ryomoto, Shunsuke Ide, Yeongju Baek
76	MEC2	Control, Mechatronics, and Robotics	Two-time Scale Control for Lane Keeping of 4WS Autonomous Ground Vehicles	Sayali Patil, Vijayraj Wanaskar, Pramod Shendge, Shrivijay Phadke
77	MOD2	Modelling, Formalisms, and Theoretical Methods	Formulation of Approximate Generalised Generated Data Based Model for Estimation of Centre Distance of Drive and Driven Pullleys of a Flat Belt Drive	Prashant Maheshwary, J. P. Modak
81	FLX2	Flexible Multibody Systems	Dynamics of Single-Link Flexible Manipulator: Theoretical and Experimental Study	Paramanand Nandihal, Vikash Kumar, Sandeep Kumar, Subir Kumar Saha, Ashish Singla, Satinder Paul Singh, Tarun Kumar Bera
83	BIO2	Biomechanics	An Equivalent Shoulder Model for Real-time Motion Capture and Reconstruction	Urbano Lugrís, Francisco Mouzo, Mario Lamas, Javier Cuadrado
85	APP1	Applications, Multidisciplinary Methods, and Other Topics	Validation of MBD-CFD Co-Simulation for Corrugating Machine	Rohit Arora, Atsushi Nakagawa, Tomoshige Takata, Tomohiro Akaki, Hiroyuki Kanazawa
87	FLX1	Flexible Multibody Systems	Modeling and Control of Shape Memory Alloy Spring Actuator in a Flexible Tube Manipulator	NISHA BHATT, Samyak Jain, vedanshu seedwan, Sanjeev soni, Ashish Singla
88	DYN1	Dynamics of Vehicles	Performance Evaluation of LuGre and Masing Models for Steering Torque Simulator	Taichi Shiiba, Shingo Haketa, Katsuhide Ishii, Sena Inoue
93	BIO1	Biomechanics	Multibody and Lumped-mass Modeling and Sensitivity Analysis	Jefferson Vieira, Luis Gomez-Valbuena, Gerardo Olivares, Hamid Lankarani

96	CON	Contact, Impact, and Constraints	A note of controlled Rolling In-Hand Manipulation on Geodesic Curves	Rajesh Kumar, Sudipto Mukherjee
102	DYN2	Dynamics of Vehicles	Segment Based Modeling for Running Time Estimation of Rail Vehicles	Shashwat Jain, Bhanu Vardhan Chenoju, Vishnu S, Rajeevlochana G Chittawadigi, Subir Kumar Saha, Satinder Paul Singh, Vijay Kumar Goel, Sudhakar Kumar
103	SOC	MBD for Social Applications	Dynamic Analysis of the RuTAG Treadle Pump with Rocker-Link Mechanism	Suraj Bhat, Subir Kumar Saha, Vinay Gupta
104	MBD	Multibody Kinematics	Modeling, simulation, optimization of the DLR Scout rover to enable extraterrestrial cave exploration	Antoine F. X. Pignède, Roy Lichtenheldt
106	SOC	MBD for Social Applications	Mechanized Roller for Handmade Felt Making	R. P. Saini, Sunil Kumar Singal, Vijay Saini, Yogeshwar Kumar, Imtiyaz Ali
110	BIO1	Biomechanics	Mobile Haptic Device for Large Virtual Environments	Sasivarnan S K, Abinaya P, Prasanna Kumar Routray, Manivannan Muniyandi
111	MEC1	Control, Mechatronics, and Robotics	Design of Flexure Robotic Hand for Teleoperation	Shubham Bhandari, Rohit Kumar Bindal, Payal Sharma, Mohd Zubair, Divanshu JAIN
112	CON	Contact, Impact, and Constraints	DeNOC based dynamic modelling of a biped system using recursive formulation to model ground impact	Alinjar Dan, Subir Kumar Saha, Rama Krishna K
114	COMP1	Computational Methods and Real-Time Applications	Improved Graphical User Interface(GUI) of Recursive Dynamics Simulator (ReDySim) for Multibody systems	Dinesh Kumar S, Alinjar Dan, Saurabh Chaudhary, Subir Kumar Saha, Suril Shah
119	FLX2	Flexible Multibody Systems	Dynamic Analysis of Naturally Curved Rods using Cosserat Rod Theory	Sreejath S, Subir Kumar Saha, Satinder Paul Singh
121	SOC	MBD for Social Applications	Preliminary Design of a new mechanism for Sheep Shearing Device	Gunjan Mathur, Rama Krishna K, Subir Kumar Saha
125	MBD	Multibody Kinematics	Investigation of Indirect Force Control Strategies on Parallel Manipulator	Akshay Goel, Suril Shah
130	BIO1	Biomechanics	Use of Inertial Measurement Units for Filter-tuning in Optical Motion Capture	Florian MICHAUD, Urbano LUGRÍS, Manuel Perez-Soto, Javier Cuadrado
131	MOD	Modelling, Formalisms, and Theoretical Methods	Review on Motion Planning of Space Robots	Prasad Dal, Suril Shah
132	BIO2	Biomechanics	Perception based Biomechanical Model Reduction for Needle Insertion Training Simulators	Ravali Gourishetti, Manivannan Muniyandi
136	APP2	Applications, Multidisciplinary Methods, and Other Topics	Passive Gravity Compensation (PGC) of serial link manipulators for Remote Handling (RH) application	ManoahStephen Manuelraj, Ramasubramanian N
139	MEC1	Control, Mechatronics, and Robotics	Design and Development of a New Rotary Actuator based on Shape Memory Alloy and Permanent Magnet System	Deep Singh, RUTUPURNA CHOUDHURY, Yogesh Singh, Santhakumar Mohan

145	MOD	Modelling, Formalisms, and Theoretical Methods	NOC based Dynamic Modelling of Multiphysics Systems: Studies on a DC Motor	Udayan Banerjee, Subir Kumar Saha, Indra Narayan Kar
149	MOD2	Modelling, Formalisms, and Theoretical Methods	Movement of a Bowed Subassembly Within a Fast Reactor Core cavity: A Multibody Dynamics Approach	VANDEEP GODHANI, R.SURESH KUMAR, SANJEEV KUMAR, JOSE VARGHESE
165	MBD	Multibody Kinematics	Investigation of the driving characteristics of electric bicycles by means of multi-body simulation	Johannes Bolk, Burkhard Corves
166	DYN2	Dynamics of Vehicles	Estimating coach suspension parameters through stop braking: Analytical modeling and validation	Sudhir Kumar Singh, Sanjay R. Singh, Vikranth Racherla
167	SOC	MBD for Social Applications	Multibody Dynamics Software-based simulation of a game for Robotics competitions	Sandeep Kumar, Subir Kumar Saha, Satinder Paul Singh
168	MEC2	Control, Mechatronics, and Robotics	Development of affordable Collaborative Robots for Engineering Education	Ranga Rakesh Ranganayakulu, Sai Thilak Karanam Sreedhar, Aditya Navghare Shridhar, Madhanagopal Manoharan, Senthilkumaran Kumaraguru
171	BEN	Benchmark Problems in Multibody System Dynamics	Non-linear Dynamic Analysis of Spur Gear pair with Rotor Bearing Clearances	Shubham Wasnik, Vikash Kumar, Shubhranshu Ranjan Sharma, Somnath Sarangi
173	COMP1	Computational Methods and Real-Time Applications	Multibody System Dynamics Simulation for Automotive Cyber-Physical Test Benches	Jon García-Urbieta, Diego J. Palomar, Marta Marijuan, Borja Rodríguez, Francisco Gonzalez
175	APP1	Applications, Multidisciplinary Methods, and Other Topics	Multibody Dynamics study of Subassembly Transfer Flask under Seismic Excitation:	SASIDHAR INAKOLLU, SAJISH S.D., JOSE VARGHESE
176	APP3	Applications, Multidisciplinary Methods, and Other Topics	Modified Lagrangian Formulation of Gear Tooth Crack Analysis using Combined Approach of Variable Mode Decomposition (VMD) – Time Synchronous Averaging (TSA)	Subrata Mukherjee, Vikash Kumar, Somnath Sarangi
177	COMP2	Computational Methods and Real-Time Applications	Comparison of Integration Methods for Real-Time Capable Multibody Simulation of an Elastokinematic Wheel Suspension System	Jan-Lukas Archut, Burkhard Corves
179	FLX1	Flexible Multibody Systems	A study of Harmonic drive nonlinear torsion stiffness based on flexible multi-body dynamics simulation	SeokHee Han, Joonho Lee, Jonghyeon Sohn, Byung-Kil Han, Joo-Hong Lee, Dongll Park, Jin-Gyun Kim
180	OPT	Optimization, Sensitivity Analysis, and Parameter Identification	Innovative two-axle vehicle with improved ride comfort via blended active vibration control	Rocco Libero Giossi, Rickard Persson, Sebastian Stichel

181	DYN2	Dynamics of Vehicles	Simulation based Risk Analysis of Autonomous Emergency Braking System Test Scenario Using Analytic Hierarchy Process Method	Shengpeng Zhang, Jiyeon Choi, Donghoe Heo, Jongmin Baek, Yeongseo Park, Taeoh Tak
182	COMP2	Computational Methods and Real-Time Applications	Hardware-in-the-loop Simulator of Hydraulic Manipulator System for Decommissioning Nuclear Power Plant	MyoungHo Kim, Sung-Soo Kim, Sung-Uk Lee
183	CON	Contact, Impact, and Constraints	Numerical Considerations for Simulating Wear in Revolute Joints	Mario López Lombardero, Javier Cuadrado, Mario Cabello, Félix Martínez
184	APP2	Applications, Multidisciplinary Methods, and Other Topics	Kalman Filters Based on Multibody Models with Colored Noise	Antonio J. Rodriguez, Emilio Sanjurjo, Miguel A. Naya
186	BIO1	Biomechanics	Estimating Double-stance Ground Reaction Forces and Moments From Motion Capture Data Without Using Force Plate Measurements	Behzad Danaei, John McPhee
188	MEC2	Control, Mechatronics, and Robotics	Approaches for Feedforward Control of Flexible Multibody Systems Modeled by the ANCF	Svenja Drücker, Robert Seifried
189	MBD	Multibody Kinematics	Multibody Constrained Dynamic Modelling of Human-Exoskeleton: Toward Optimal Design and Control of an Active-passive Wearable Robot	Ali Nasr, John McPhee
190	DYN1	Dynamics of Vehicles	Enhanced Hierarchical Multiscale Modeling for Off-Road Mobility Simulation with Neural Network Surrogate Model	Guanchu Chen, Hiroki Yamashita, Yeefeng Ruan, Paramsothy Jayakumar, Kenneth Leiter, Jaroslaw Knap, Xiaobo Yang, Hiroyuki Sugiyama
191	MEC1	Control, Mechatronics, and Robotics	Fabrication and Stabilization of Rotary Inverted Pendulum Setup using a PID Controller (STRIPS 1.0)	Tufail Ahmad Bhat, Dr. Majid Hameed Koul
192	APP1	Applications, Multidisciplinary Methods, and Other Topics	Aerial Transportation and Manipulation of a Cable-Slung Payload with Decentralized Swarm Agents	Aniket Sharma, Nandan Sinha
193	FLX2	Flexible Multibody Systems	A Unified Framework for Linearly-Elastic Flexible Multibody System Dynamics Formulations	Andreas Zwölfer, Johannes Gerstmayr
194	FLX1	Flexible Multibody Systems	Flexible Rotating Multibody Analysis Using Extended NPFE for Non-Equatorial Space Elevator	Ryo Kuzuno, Shuonan Dong, Yuya Takahashi, Taiki Okada, Yoshitaka Shizuno, Keisuke Otsuka, Kanjuro Makihara
195	MOD	Modelling, Formalisms, and Theoretical Methods	Mechanics of Flexible Bodies in Local Orthonormal Frames	Valentin Sonneville, Michel Géradin

197	COMP2	Computational Methods and Real-Time Applications	Digital Twin Model of Marine Robot using Recursive Subsystem Synthesis Method	Sung-Soo Kim, Chang-Ho Lee, Jong-Boo Han
198	DYN1	Dynamics of Vehicles	Estimation of Wheelset Equivalent Conicity using the Dual Extended Kalman Filter	Prapanpong Damsongsaeng, Rickard Persson, SEBASTIAN STICHEL, Carlos Casanueva
199	COMP1	Computational Methods and Real-Time Applications	Exudyn - A C++ based Python package for flexible multibody systems	Johannes Gerstmayr
200	CON	Contact, Impact, and Constraints	A Study on Contact Behavior of ANCF Flexible Beams	Ken Suzuki, Yoshiki Sugawara, Masakazu Takeda
201	CON	Contact, Impact, and Constraints	A dynamic friction model with normal force and coefficients of friction as parameters of transition range	Ekansh Chaturvedi, Jyotirmoy Mukherjee, Corina Sandu
203	OPT	Optimization, Sensitivity Analysis, and Parameter Identification	Sensitivity analysis of semi-recursive augmented Lagrangian formulations with projections	Álvaro López Varela, Daniel Dopico, Alberto Luaces
204	APP2	Applications, Multidisciplinary Methods, and Other Topics	A linear frequency domain solver workflow for fast simulation of transmission systems	Josef Haslinger, Klaus-Dieter Bauer, Günter Offner
209	FLX1	Flexible Multibody Systems	Command Shaped Trajectory Tracking Control for a Two-link Flexible Manipulator	Sandeep Kumar, Subir Kumar Saha, Ashish Singla, Satinder Paul Singh, Tarun Kumar Bera
211	CON	Contact, Impact, and Constraints	A 2D Unified Gait Model for both single and double stances	ABHYUDIT SINGH MANHAS, Sourav Rakshit
214	APP2	Applications, Multidisciplinary Methods, and Other Topics	Soft robotic prosthetic hand based on Fin Ray effect	Sekar Anup Chander, Banibrata Datta, Srikanth Vasamsetti, MD Sameer, Akshit Gupta, P S Suvin
215	APP2	Applications, Multidisciplinary Methods, and Other Topics	Finite Element Analysis to Study the Effect of Tool Deflection in Incremental Forming Process	ELDHO PAUL, Hariharan Krishnaswamy, Riby A Boby, Sahil Bharti
216	BIO2	Biomechanics	Optimal trajectory stabilization of lower limb exoskeleton involving hybrid contact dynamics	Mowbray RV, Sourav Rakshit
219	BEN	Benchmark Problems in Multibody System Dynamics	Modeling and Validation of Human Gait Dynamics using Modified Euler-Lagrange Approach	sekar anup chander, Ashutosh Mukherjee, Vhatkar Dattatraya Shivling, Ashish Singla
220	MEC2	Control, Mechatronics, and Robotics	UAV Landing on General Moving Platforms Without Markers	Sagar Dalai, Kanishk Vishwakarma, Kaushal Kishore, Dhruv Potdar, Manan Arora
221	MOD	Modelling, Formalisms, and Theoretical Methods	Modelling of 12-DoF Parachute – Riser – Payload System Dynamics using Kane's method	Prashant Iyer

222	OPT	Optimization, Sensitivity Analysis, and Parameter Identification	Optimal design and control of the steering of a tilting tricycle	Alberto Luaces, Álvaro López Varela, Adwait Verulkar, Corina Sandu, Adrian Sandu, Daniel Dopico
223	DYN2	Dynamics of Vehicles	Application of an iterative rheo-linear frequency domain solver to unbalance effects of transmission systems	Klaus-Dieter Bauer, Josef Haslinger, Günter Offner
224	DYN1	Dynamics of Vehicles	Breaking simulation of railway vehicle under low friction coefficient conditions considering wheel slide re-adhesion control	Sora Sakanishi, Shihpin LIN, YOSHIHIRO SUDA
226	APP3	Applications, Multidisciplinary Methods, and Other Topics	Multi-body Dynamic Analysis of Ammunition Transfer and Ramming Mechanisms in the Autoloader of Military Tracked Vehicle	Y.K Singh, S. Dev Anandh, Sunny Kumar, S Banerjee, G Srinivasan
227	APP1	Applications, Multidisciplinary Methods, and Other Topics	Digital Twin for the Condition Monitoring of Railway Bogies Based on Multibody Dynamics Tools	Jorge Ambrósio, João Pagaimo, Pedro Millan, João Costa