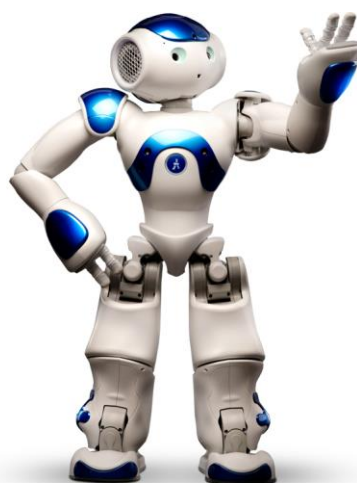




ROMANSY 2018

22nd CISM IFTOMM Symposium on
Robot Design, Dynamics and Control
June 25-28, 2018
Rennes, France

SCIENTIFIC PROGRAM



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Conference program

ROMANSY 2018 will be held in Rennes from June 25 to June 28, 2018
in the conference hall of the hotel MERCURE CENTRE GARE

<https://www.booking.com/hotel/fr/rennes-centre-colombier.fr.html>



**CONFERENCE HALL
(First floor)**

**MERCURE CENTRE GARE
hotel**

**Address: 1, street Capitaine
Maignan, 35000
Rennes, France
Tel : (+33)299297373**

<https://romansy2018.ls2n.fr>

ORGANIZED BY

INSA-Rennes (Institut National des Sciences Appliquées de Rennes) and **LS2N** (Laboratoire des Sciences du Numérique de Nantes).

UNDER THE PATRONAGE OF IFToMM

The conference is under the patronage of IFToMM, the International Federation for the Promotion of Mechanism and Machine Science, which supports two Young Delegate Grants.

RENNES

Rennes is the capital of the region of Brittany. Rennes's history goes back more than 2,000 years. Together with Vannes and Nantes, it was one of the major cities of the historic province of Brittany. During the 1980s, Rennes became one of the main centers in telecommunication and high technology industry. It is now a significant digital innovation center in France. The city is the tenth largest in France, with a metropolitan area of about 700,000 inhabitants, with more than 63,000 students and the eighth-largest university campus of France. Rennes has well-developed national road, rail and air links. It is located less than 1.5 hours from Paris by TGV high speed train.

Coffee breaks, lunches, welcome reception and gala dinners are included in the conference fee.

PLENARY SESSION: LENGTH OF PRESENTATION: 15 MIN + 5 MIN DISCUSSION

09:00-09:40 Registration

09:40-10:00 Opening Ceremony

PLENARY SESSION I / KINEMATICS FOR ROBOTICS

Chairmen: Andres KECSKEMETHY and Philippe WENGER

10:00-10:20 **Francisco Geu Flores, Sebastian Röttgermann, Bettina Weber and Andrés Kecskeméthy.** A Generalized Approach for Robust Position Inverse Kinematics Including Simultaneous Singularities Based on the Virtual Redundant Axis Method

10:20-10:40 **Huimin Dong, Tianhang Chen, Delun Wang and Bo Dong.** Kinematic Model of Harmonic Drive in Robot Joints with Input Eccentricity Error

10:40-11:10 COFFEE BREAK

11:10-11:30 **Enrico Ferrentino and Pasquale Chiacchio.** Topological Analysis of Global Inverse Kinematic Solutions for Redundant Manipulators

11:30-11:50 **Adrián Peidró Vidal, José María Marín, Óscar Reinoso, Luis Payá and Arturo Gil.** Parallelisms Between Planar and Spatial Tricept-like Parallel Robots

11:50-12:10 **Carlos Rodrigues, Miguel Correia, João Abrantes, Jurandir Nadal and Marco Aurélio Benedetti Rodrigues.** Complementary Domain Assessment of Human Lower Limb Joint Angular Kinematics on Modified Gait

12:10-14:00 LUNCH / RESTAURANT IN THE HOTEL "MERCURE"

PLENARY SESSION II / STATICS FOR ROBOTICS

Chairmen: Jorge ANGELES and Damien CHABLAT

14:00-14:20 **Burkhard Corves, Christian Mirz, Jan Brinker, Yukio Takeda and Daisuke Matsuura.** Stiffness Analysis of Delta Parallel Robots Combining the Virtual Joint Method with an FEA Stiffness Model

14:20-14:40 **Marek Wojtyra.** Modeling of Static Friction in Closed-Loop Kinematic Chains With Multiple Degrees of Freedom—a Study of Uniqueness and Parametric Sensitivity

14:40-15:00 **Qi Sun, Jorge Angeles and James Forbes.** Elastostatics of a Full-mobility PKM with Flexible Links

15:00-15:20 **Monica Malvezzi, Gionata Salvietti and Domenico Prattichizzo.** Evaluation of Grasp Stiffness in Underactuated Compliant Hands Exploiting Environment Constraints

15:20-15:40 **Alexandr Klimchik, Damien Chablat and Anatol Pashkevich.** Advancement of MSA-technique for stiffness modeling of serial and parallel robotic manipulators

15:40-16:10 COFFEE BREAK / ISC MEETING: Chaired by Prof. Vincenzo PARENTI CASTELLI

PLENARY SESSION III / DYNAMICS FOR ROBOTICS

Chairmen: Nicolay Bolotnik and Stéphane CARO

- 16:10-16:30 **Jan Brinker, Maximilian Schmitz, Yukio Takeda and Burkhard Corves.** Dynamic Modeling of Functionally Extended Delta-Like Parallel Robots with Virtual Tree Structures
- 16:30-16:50 **Nicolay Bolotnik, Vladislav Chashchukhin, Valery Gradetsky, Dmitry Kozlov, Armen Nunuparov, Igor Smirnov and Andrei Zhukov.** Thermomechanical Actuator for Microrobotic Systems: A Model and Parameter Estimation
- 16:50-17:10 **Armen Nunuparov, Felix Becker, Nicolay Bolotnik, Igor Zeidis and Klaus Zimmermann.** Vibration-Driven Capsbot With an Opposing Spring: An Experimental Study
- 17:10-17:30 **Anders van Riesen, Matthieu Furet, Chevallereau Christine and Philippe Wenger.** Dynamic analysis and control of an antagonistically actuated tensegrity mechanism
- 17:30-18:10 **Sana Baklouti, Stéphane Caro and Eric Courteille.** Elasto-Dynamic Model-Based Control of Non-Redundant Cable-Driven Parallel Robots
- 18:15-19:00 **AB Meeting / Chaired by Prof. Vincenzo PARENTI CASTELLI, CISM Representative**
- 19:00-22:00 **WELCOME RECEPTION DINNER / RESTAURANT "LA TAVERNE"**

TUESDAY

26/06/2018

Keynote speaker: Marco CECCARELLI

09:00-09:20 **CHALLENGES FOR MECHANISM DESIGN IN ROBOTICS**

PLENARY SESSION IV / HUMANOID AND REHABILITATION ROBOTS

Chairmen: Atsuo TAKANISHI and Victor GLAZUNOV

- 09:20-09:40 **Hu Yuan, Guo Weizhong, Gao Feng and Chen Hao.** The Design of Legged Mobile Welding Robot
- 09:40-10:00 **Takashi Matsuzawa, Takanobu Matsubara, Kenji Hashimoto, Tomotaka Teramachi, Xiao Sun, Shunsuke Kimura, Nobuaki Sakai, Yuki Yoshida, Asaki Imai, Kengo Kumagai, Koki Yamaguchi, Keisuke Namura and Atsuo Takanishi.** Body Mechanism with Linear Spikes for Slippage Reduction of Four-limbed Robot Crawling on Uneven Terrain
- 10:00-10:20 **Teresa Zielińska and Jikun Wang.** Two methods of EMG analysis for the purpose of exoskeletons and robotic rehabilitation devices
- 10:20-10:40 **COFFEE BREAK**
- 10:40-11:00 **Jia-Yeu Lin, Sarah Cosentino, Kei Matsuki, Mao Kawai, Salvatore Sessa and Atsuo Takanishi.** Musical Articulation System on Humanoid Saxophonist Robot

- 11:00-11:20 Takuya Otani, Kenji Hashimoto, Akira Natsuhara, Masanori Sakaguchi, Yasuo Kawakami, Hun-Ok Lim and Atsuo Takanishi.** Ankle and Foot Mechanism Mimicking Joint Stiffness and Following Motion based on Human
- 11:20-11:40 Luis Enrique Coronado Zuniga, Fulvio Mastrogiovanni and Gentiane Venture.** Design of a human-centered robot framework for end-user programming and applications
- 11:40:12:00 Philippe Lucidarme, Nicolas Delanoue, Franck Mercier, Yannick Aoustin, Christine Chevallereau and Philippe Wenger.** Preliminary survey of backdrivable linear actuators for humanoid robots

12:10-14:00 LUNCH / RESTAURANT "FELIX"

PLENARY SESSION V / MODELLING AND CONTROL OF ROBOTS

Chairmen: Vincenzo PARENTI CASTELLI and Gabriel ABBA

- 14:00-14:20 Alexander Reiter, Andreas Müller and Hubert Gattringer.** Rapid Nearly-Optimal Rendezvous Trajectory Planning Using Parameter Sensitivities
- 14:20-14:40 Mohamed Fnadi, Bachir Menkouz, Frédéric Plumet and Faïz Ben Amar.** Path tracking control in case of double steering for off-road mobile robot
- 14:40-15:00 Tasuku Yamawaki and Masahito Yashima.** Iterative Learning Scheme for In-hand Manipulation with Stochastic Gradient Method
- 15:00-15:20 Komlan Kolegain, François Leonard, Sandra Chevret, Amarilys Ben Attar and Gabriel Abba.** Robotic Friction Stir Welding off-line path planning with deflection compensation using B-splines
- 15:20-15:40 Adrien Koessler, Nicolas Bouton, Sébastien Briot, Belhassen Chedli Bouzgarrou and Youcef Mezouar.** Linear Adaptive Computed Torque Control for Singularity Crossing of Parallel Robots
- 15:40-16:10 COFFEE BREAK**
- 16:10-16:30 Fatemeh Ansarieshlaghi and Peter Eberhard.** Trajectory Tracking Control of a Very Flexible Robot Using a Feedback Linearization Controller and a Nonlinear Observer
- 16:30-16:50 Ahmed Farid and Takafumi Matsumaru.** Path Planning of Sidewalks & Street Crossings in Pedestrian Environments Using 2D Map Visual Inference
- 16:50-17:10 Franklin Okoli, Yuchuan Lang, Olivier Kermorgant and Stephane Caro.** Cable-Driven Parallel Robot simulation using Gazebo and ROS
- 17:10-17:30 Camille Dubos, Roland Lenain and Frédéric Cointault.** Motion Coordination of a Mobile Manipulator within Control Framework: Application to Phenotyping
- 17:30-17:50 Enrico Ferrentino and Pasquale Chiacchio.** A Topological Approach to Globally-Optimal Redundancy Resolution with Dynamic Programming

18:30-19:30 Reception in Rennes city hall by President of Rennes Metropole Mr. Emmanuel COUET and Mayor of Rennes Mrs. Nathalie APPÉRE

Guests of Honour: Prof. Jorge ANGELES (McGILL University)
Prof. Vincenzo PARENTI CASTELLI (University of Bologna)

CLOSING COCKTAIL

WEDNESDAY

27/06/2018

PLENARY SESSION VI / DESIGN AND OPTIMISATION FOR ROBOTICS

Chairmen: Marco CECCARELLI and Sébastien BRIOT

09:00-09:20 Ching-Yen Weng, Wei Chian Tan and I-Ming Chen. A Survey of Dual-arm Robotic Issues on Assembly Tasks

09:20-09:40 Marie Saint-Sevin, Vincent Bégoc, Sébastien Briot, Abdelhamid Chriette and Isabelle Fantoni. Design and Optimization of a Multi-drone Robot for Grasping and Manipulation of Large size Objects

09:40-10:00 Lila Kaci, Sébastien Briot, Clément Boudaud and Philippe Martinet. Design of a Wooden Five-bar Mechanism

10:00-10:20 Yusuke Sugahara, Hayato Akiyama, Jeremy Jong, Mitsuru Endo and Jun Okamoto. A Human-Powered Robotic Personal Mobility Vehicle

10:20-10:40 COFFEE BREAK

10:40-11:00 Jhon Freddy Rodríguez León, Giuseppe Carbone, Daniele Cafolla, Matteo Russo, Marco Ceccarelli and Eduardo Castillo Castaneda. Experiences and Design of a Cable-Driven Assisting Device for Arm Motion

11:00-11:20 Luca Luzi, Nicola Sancisi and Vincenzo Parenti Castelli. A new approach to design glove-like hand exoskeletons for rehabilitation

11:20-11:40 Alexey Fomin, Victor Glazunov and Anna Terekhova. Development of a Novel Rotary Hexapod with Single Drive

11:40-12:00 Matteo Russo, Marco Ceccarelli, Daniele Cafolla, Daisuke Matsuura and Yukio Takeda. An Experimental Characterization of a Parallel Mechanism for Robotic Legs

12:00-12:20 THE AGE OF HUMAN-ROBOT COLLABORATION ROBOTICS

12:20-14:00 LUNCH / RESTAURANT "LA TAVERNE"

14:00 – 15:00 POSTER SESSION

Olivier Bordron, Clément Huneau, Eric Le Carpentier and Yannick Aoustin. Impact of a knee orthosis over walking

Mohamed Didi Chaoui, Francois Leonard and Gabriel Abba. Improving surface roughness in robotic grinding process

Ines Ben Hamida, Med Amine Laribi, Abdelfattah Mlika, Lotfi Romdhane and Said Zegloul. Geometric based approach for workspace analysis of translational parallel robots

Sylvain Devie, Pierre Philippe Robet, Yannick Aoustin and Maxime Gautier. On the use of inner position loop in co-manipulation task

Guanglei Wu and Stéphane Caro. Torsional Stability of a U-joint based Parallel Wrist Mechanism Featuring Infinite Torsion

SOCIAL EVENTS

15:00-19:00 Tours in SAINT MALO, sitting on the English Channel coast of Brittany in northern FRANCE (<http://www.ville-saint-malo.fr>)

19:00-22:00 GALA DINNER in SAINT MALO

THURSDAY

28/06/2018

PLENARY SESSION VI / DESIGN AND OPTIMISATION FOR ROBOTICS

Chairmen: Teresa ZIELINSKA and Yannick AOUSTIN

09:00-09:20 **Gizem Ateş, Luca Brunetti and Marcello Bonfé.** Improved Usability of a Low-Cost 5-DOF Haptic Device for Robotic Teleoperation

09:20-09:40 **Viet Anh Dung Cai, Philippe Bidaud and Long Triet Giang Huynh.** Design and Experimentation of a 3D ankle joint goniometer

09:40-10:00 **Bertold Bongardt.** A Workspace Scaling Method for Motion Synchronization in SE(3)

10:00-10:20 **Yang Zhang, Vigen Arakelian and Jean-Paul Le Baron.** Linkage design for gravity balancing by means of non-zero length springs

10:20-10:40 COFFEE BREAK

- 10:40-11:00** **Marko Penčić, Maja Čavić, Branislav Borovac, Zhenli Lu and Milan Rackov.** Robotic Eyes with 7 DOFs: Structural Design and Motion Simulation
- 11:00-11:20** **Atal Anil Kumar, Jean-Francois Antoine, Patrick Zattarin and Gabriel Abba.** Workspace Analysis of a 4 Cable-Driven Spatial Parallel Robot
- 11:20-11:40** **Hayder F.N. Al-Shuka and Rui Song.** Decentralized Adaptive Partitioned Approximation Control With Applications to Robotic Manipulators and Biped Robots
- 11:40-12:10** **Damien Chablat, Swaminath Venkateswaran and Frédéric Boyer.** Dynamic Model of a Bio-Inspired Robot for Piping Inspection

12:10-14:00 **LUNCH / PANCAKE RESTAURANT “KER SOAZIG”**

PLENARY SESSION VII / DESIGN AND OPTIMISATION FOR ROBOTICS

Chairmen: Marek WOJTYRA and Philippe BIDAUD

- 14:00-14:20** **Rafael Balderas Hill, Sébastien Briot, Abdelhamid Chriette and Philippe Martinet.** Minimizing Input Torques of a High-Speed Five-Bar Mechanism by using Variable Stiffness Springs
- 14:20-14:40** **Rongfu Lin and Weizhong Guo.** Type synthesis of a Legged Mobile Lander Based on a Given Truss
- 14:40-15:00** **Qingqing Li, Zhangguo Yu, Xuechao Chen, Weimin Zhang and Qiang Huang.** A Falling Forwards Protection Strategy Humanoid Robots
- 15:00-15:20** **Zewen He, Fei Meng, Huaxin Liu, Lei Wang, Xin Zhu, Xuxiao Fan, Ryuki Sato, Aiguo Ming and Qiang Huang.** Method of Design Optimization and Trajectory Implementation on A Small Cat-like Robot
- 15:20-15:40** **COFFEE BREAK**
- 15:40-16:00** **Victor De Leon Gomez, Chiara Barone, Yannick Aoustin and Christine Chevallereau.** Study of the walking efficiency of a human with a cane
- 16:00-16:20** **Olivier Chocron and Emmanuel Delaleau.** Trajectory-based synthesis of propulsion systems for fixed-thrusters AUVs
- 16:20-16:40** **Michele Perrelli, Gianluca Gatti, Maurizio Iocco and Guido A Danieli.** Upper and lower limbs rehabilitation: DARTAGNAN, an alternative solution to exoskeletal robots
- 16:40-17:00** **Eugene Briskin, Yaroslav Kalinin and Alexander Maloletov.** On Energetically Effective Modes of Walking Robots Movement

CLOSING CEREMONY