ROMANSY 2018

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

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*
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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.

Monday   25/06/2018

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

PLENARY SESSION II / STATICS FOR ROBOTICS

Chairmen: Marek WOJTYRA 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

PLENARY SESSION III / DYNAMICS FOR ROBOTICS

Chairmen: Yukio TAKEDA 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 Nikolay 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, Nikolay Bolotnik, Igor Zeidis and Klaus Zimmermann. Vibration-Driven Capsubot 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 Guanglei Wu and Stéphane Caro. Torsional Stability of a U-joint based Parallel Wrist Mechanism Featuring Infinite Torsion

19:00-22:00 WELCOME RECEPTION DINNER / RESTAURANT

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

PLENARY SESSION IV / HUMANOID AND REHABILITATION ROBOTS

Chairmen: Teresa ZIELINSKA 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
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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

PLENARY SESSION V / MODELLING AND CONTROL OF ROBOTS

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

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 Castañeda.** Experiences and Design of a Cable-Driven Assisting Device for Arm Motion
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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

Keynote speaker: Oussama KHATIB

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

12:20-14:00   **LUNCH / RESTAURANT**

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 Zeghloul. 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

Sana Baklouti, Stéphane Caro and Eric Courteille. Elasto-Dynamic Model-Based Control of Non-Redundant Cable-Driven Parallel Robots

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

PLENARY SESSION VI / DESIGN AND OPTIMISATION FOR ROBOTICS

Chairmen: Philippe BIDAUD and Vincenzo Parenti Castelli

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

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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 / RESTAURANT

PLENARY SESSION VII / DESIGN AND OPTIMISATION FOR ROBOTICS

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