ARK 2014
ADVANCES IN ROBOT KINEMATICS
programme

Ljubljana, June 29 - July 3, 2014

Organized by
J. Stefan Institute and Cankarjev dom, Ljubljana

Under patronage of
IFToMM International Federation for the Promotion of Mechanism and Machine Science

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EVENING

17:00-20:00	**Registration**
19:00-21:00	**Welcome Reception, Cankarjev dom CD Club** Entrance from Erjavčeva Street

MONDAY, JUNE 30, 2014

MORNING

08:00-18:00	**Registration**
09:00-09:20	Computing Cusps of 3R Robots Using Distance Geometry *Federico Thomas*
09:20-09:40	Kinematic Mapping of SE(4) and the Hypersphere Condition *Georg Nawratil*
09:40-10:00	Direct Kinematics of an Orthogonal 6PRRS Parallel Manipulator *Paul Zsombor-Murray*
10:00-10:20	The Hidden Robot Concept: a Tool for Control Analysis and Robot Control-based Design *Sébastien Briot, Victor Rosenzveig and Philippe Martinet*
10:20-10:50	**Coffee break**
10:50-11:10	Impact of Perturbation on Wire Tension Vector *Leila Notash*
11:10-11:30	A Deployable Parallel Wrist with Simple Kinematics *Raffaele Di Gregorio*
11:30-11:50	Geometric Derivation of 6R Linkages with Circular Translation *Chung-Ching Lee and Jacques M. Hervé*
11:50-12:10	Function Synthesis of the Planar 5R Mechanism Using Least Squares Approximation *Gökhan Kiper, Barış Bağdadioğlu and Tunç Bilgincan*

AFTERNOON

15:00-15:20	Some Remarks on the RRR Linkage *J. M. Selig*
15:20-15:40	Force Capability Polytope of a 4RRR Redundant Planar Parallel Manipulator *Leonardo Mejia, Henrique Simas and Daniel Martins*
15:40-16:00	Motion Planning of Non-holonomic Parallel Orienting Platform: A Jacobian Approach *Krzysztof Tchoń and Janusz Jakubiak*
16:00-16:20	Nonsingular Change of Assembly Mode Without any Cusp *Michel Coste, Damien Chablat and Philippe Wenger*
16:20-16:50	**Coffee break**
16:50-17:10	The Influence of Discrete-Time Control on the Kinematico-Static Behavior of Cable-Driven Parallel Robot with Elastic Cables *Jean-Pierre Merlet*
17:10-17:30	Derivatives of Screw Systems in Body-fixed Representation *Andreas Müller*
17:30-17:50	Sharp Linkages *Zijia Li*
17:50-18:10	Solvable Multi-Fingered Hands for Exact Kinematic Synthesis *Abhijit Makhal and Alba Perez Gracia*

EVENING

20:00-23:00	**Reception, Antiq Palace Hotel, Location: 10 Gosposka Street** *Meeting point: 19.45, The Slovenian Philharmonic, 10 Congress Square*

TUESDAY, JULY 1, 2014

MORNING

09:00-09:20 Non-Singular Assembly Mode Changing Trajectories in the Workspace for the 3-RPS Parallel Robot
Damien Chablat, Ranjan Jha, Fabrice Rouillier and Guillaume Moroz

09:20-09:40 Influence of Spring Characteristics on the Behavior of Tensegrity Mechanisms
Quentin Boehler, Marc Vedrines, Salih Abdelaziz, Philippe Poignet and Pierre Renaud

09:40-10:00 Human Motion Kinematics Assessment Using Wearable Sensors
Sebastjan Šlajpah, Roman Kamnik and Marko Munih

10:00-10:20 Stiffness Matrix of 6-DOF Cable-Driven Parallel Robots and its Homogenization
Dinh Quan Nguyen and Marc Gouttefarde

10:20-10:50 **Coffee break**

10:50-11:10 Human Motion Mapping to a Robot Arm with Redundancy Resolution
Fanny Ficuciello, Amedeo Romano, Vincenzo Lippiello, Luigi Villani and Bruno Siciliano

11:10-11:30 Analysis of Geometrical Force Calculation Algorithms for Cable-Driven Parallel Robots with a Threefold Redundancy
Katharina Müller, Christopher Reichert and Tobias Bruckmann

11:30-11:50 Kinetostatic Analysis of Cable-Driven Parallel Robots with Consideration of Sagging and Pulleys
Marc Gouttefarde, Dinh Quan Nguyen and Cédric Baradat

11:50-12:10 Direct and Inverse Second Order Kinematics for Hyper-Redundant Parallel Robots
Georges Le Vey

AFTERNOON

15:00-20:00 **Visit to Technical Museum in Bistra near Vrhnika**
Meeting point: 15.00, Cankarjev dom, Erjavčeva Street
Departure by bus

Behind the gates of a former Carthusian monastery you can find Slovenia's largest museum – The Technical Museum of Slovenia. It is located in the most beautiful natural surroundings on the outskirts of Ljubljana. Several collections can be seen in the museum: from forestry, woodworking, hunting, fishing and agricultural departments, to textiles, printing, traffic and electrical engineering. The attention of most visitors is drawn towards the water-driven elements -the flour mill, blacksmith's workshop, fulling mill and veneer sawmill. Road vehicle fans aren't disappointed either. They can admire the oldest surviving car from Slovenia or enjoy the sight of the limousines that once belonged to President Tito, Premier of former Yugoslavia.

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WEDNESDAY, JULY 2, 2014

MORNING

09:00-09:20 Kinematic Design of Miura-Ori-Based Folding Structures Using the Screw Axis of a Relative Displacement
Kassim Abdul-Sater, Tim C. Lueth and Franz Irlinger

09:20-09:40 On the Limitations on the Lower and Upper Tensions for Cable-driven Parallel Robots
Andreas Pott

09:40-10:00 Characterization of the Subsystems in the General Three-System of Screws
Marco Carricato and Dimiter Zlatanov

10:00-10:20 Geometrical Patterns for Measurement Pose Selection in Calibration of Serial Manipulators
Alexandr Klimchik, David Daney, Stephane Caro and Anatol Pashkevich

10:20-10:50 **Coffee break**

10:50-11:10 Stiffness Analysis of a Fully Compliant Spherical Chain with Two Degrees of Freedom
Farid Parvari Rad, Giovanni Berselli, Rocco Vertechy and Vincenzo Parenti-Castelli

11:10-11:30 Points, Lines, Screws and Planes in Dual Quaternions Kinematic
Luiz Alberto Radavelli, Edson Roberto De Pieri, Daniel Martins and Roberto Simoni

11:30-11:50 Recovering Dual Euler Parameters from Feature-based Representation of Motion
Daniel Condurache and Adrian Burlacu

11:50-12:10 Kinematics and Dynamics of a 3-RPSR Parallel Robot Used as a Pipe-Bending Machine
Mario Alberto Garcia-Murillo, Yukio Takeda, Eduardo Castillo-Casataneda, Daisuke Matsuura, Syohei Kawasumi and Jaime Gallardo-Alvarado

AFTERNOON

15:00-15:20 Kinematic Synthesis of a Watt I Six-bar Linkage for Body Guidance
Mark Plecnik, J. Michael McCarthy and Charles W. Wampler

15:20-15:40 Collision-Free Workspace of 3-RPR Planar Parallel Mechanism via Interval Analysis
MohammadHadi FarzanehKaloorazi, Mehdi Tale Masouleh and Stéphane Caro

15:40-16:00 Development of a One Degree of Freedom Mechanical Thumb Based on Anthropomorphic Tasks for Grasping Applications
Shramana Ghosh and Nina Patarinsky Robson

16:00-16:20 Trifurcation of the Evolved Sarrus-Motion Linkage Based on Parametric Constraints
Ketao Zhang and Jian S. Dai

16:20-16:50 **Coffee break**

16:50-17:10 The Kinematics of Containment
Gregory S. Chirikjian and Yan Yan

17:10-17:30 The Dimensional Synthesis of 3-RPR Parallel Mechanisms for a Prescribed Singularity-Free Constant-Orientation Workspace
Amirhossein Karimi, Mehdi Tale Masouleh and Philippe Cardou

17:30-17:50 Approximating Constrained Hand Paths via Kinematic Synthesis with Contact Specifications
Hyosang Moon, Nina P. Robson and Reza Langari

17:50-18:10 Investigation of Error Propagation in Multi-Backbone Continuum Robots
Long Wang and Nabil Simaan

EVENING

20:00-23:00 **Conference Dinner, AS Restaurant, 5a Čopova Street**

THURSDAY, JULY 3, 2014

MORNING

09:00-09:20 Kinematics of Expansive Planar Periodic Mechanisms
Ciprian S. Borcea and Ileana Streinu

09:20-09:40 From Inverse Kinematics to Optimal Control
Perle Geoffroy, Nicolas Mansard, Maxime Raison, Sofiane Achiche and Emo Todorov

09:40-10:00 New Gravity Balancing Technique and Hybrid Actuation for Spatial Serial Manipulators
Basilio Lenzo, Antonio Frisoli, Fabio Salsedo and Massimo Bergamasco

10:00-10:20 Analysis of Constraint Equations and Their Singularities
Rangaprasad Arun Srivatsan and Sandipan Bandyopadhyay

10:20-10:50 **Coffee break**

10:50-11:10 Shape Optimized Heliostats for Kinematic Sun Tracking
Li Meng, Zheng You and Steven Dubowsky

11:10-11:30 Efficient Resolution of Hyper-Redundancy Using Splines
Midhun Sreekumar Menon, B. Gurumoorthy and Ashitava Ghosal

11:30-11:50 Kinematic Modeling of an EAP Actuated Continuum Robot for Active Micro-Endoscopy
Mohamed Taha Chikhaoui, Kanty Rabenorosoa and Nicolas Andreff

11:50-12:10 Kinematics Analysis and Singularity Loci of a 4-UPU Parallel Manipulator
Massimiliano Solazzi, Massimiliano Gabardi, Antonio Frisoli and Massimo Bergamasco

AFTERNOON

15:00-15:20 On the Kinematics of an Innovative Parallel Robot for Brachytherapy
Bogdan Gherman, Nicolae Plitea, Bogdan Galdau, Calin Vaida and Doina Pisla

15:20-15:40 Reconfigurable and Deployable Platonic Mechanisms with a Variable Revolute Joint
Guowu Wei and Jian S. Dai

15:40-16:00 Conditions for Sub-6th Order Screw Systems Composed of Three Planar Pencils of Lines
Xianwen Kong and Duanling Li

16:00-16:20 Automatic Optimal Biped Walking as a Mixed-Integer Quadratic Program
Aurelien Ibanez, Philippe Bidaud and Vincent Padois

16:20-16:50 **Coffee break**

16:50-17:10 Mechanisms with Decoupled Freedoms Assembled from Spatial Deployable Units
Shengnan Lu, Dimiter Zlatanov, Xilun Ding, Rezia Molfino and Matteo Zoppi

17:10-17:30 Motion Capability of the 3-RPS Cube Parallel Manipulator
Latifah Nurahmi, Josef Schadlbauer, Manfred Husty, Philippe Wenger and Stéphane Caro

17:30-17:50 Coupling of Trajectories for Human-Robot Cooperative Tasks
Andrej Gams, Bojan Nemec, Tadej Petrič and Aleš Ude

17:50-18:10 Dynamic Analysis of 4 Degrees of Freedom Redundant Parallel Manipulator
Samah Shayya, Sébastien Krut, Olivier Company, Cédric Baradat and Francois Pierrot

EVENING

18:10-19:30 **Farewell, Cankarjev dom CD Club**

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A D V A N C
E S I N R O
B O T K I N
E M A T I C S
programme

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