

Computational Kinematics, May 6 - 8, 2009

Technical Program - Final Update

Wednesday, May 6, 2009

8:00 - 8:30 Registration

8:30 - 9:00 Opening

9:00 - 10:20 Cable-Driven Parallel Manipulators

Chair: J. Angeles

9:00 - 9:20 Kinematic Analysis of a Spatial Four-Wire Driven Parallel Crane without Constraining Mechanism
J.P. Merlet, D. Daney

9:20 - 9:40 Extension of Antipodal Theorem to Workspace Analysis of Planar Wire-Actuated Manipulators
D. McColl, L. Notash

9:40 - 10:00 Modelling and Simulation of a Cable-Based Parallel Manipulator as an Assisting Device
G. Castellj, E. Ottaviano

10:00 - 10:20 Closed-form Force Distribution for Parallel Wire Robots
A. Pott, T. Bruckmann, L. Mikelsons

10:20 - 10:40 Coffee Break

10:40 - 12:00 Parallel Manipulators (1)

Chair: J.P. Merlet

10:40 - 11:00 Computing the Configuration Space for Motion Planning Between Assembly Modes
M. Urizar, V. Petuya, O. Altuzarra, A. Hernandez

11:00 - 11:20 Kinematic Analysis of a Class of Analytic Planar 3-RPR Parallel Manipulators
P. Wenger, D. Chablat

11:20 - 11:40 Non-singular Assembly Mode Change in 3-RPR-Parallel Manipulators
M.L. Husty

11:40 - 12:00 Kinetostatic and Singularity Analyses of the 3-UPU Translational Parallel Robot
A-H. Chebbi, Z. Affi, L. Romdhane

12:00 - 14:00 Lunch Break

14:00 - 15:00 Parallel Manipulators (2)

Chair: E. Ottaviano

14:00 - 14:20 Forward Displacement Analysis of a 3-RPR Planar Parallel Manipulator Revisited
X. Kong

14:20 - 14:40 Sensitivity and Dexterity Comparison of 3-RRR Planar Parallel Manipulators
N. Binaud, S. Caro, P. Wenger

14:40 - 15:00 On New Class of Parallel-Cross Mechanisms
V.A. Glazunov, S. Briot, V. Arakelian, M.T. Nguyen

15:00-15:20 Coffee Break

15:20 - 16:40 Motion Planning

Chair: P. Wenger

15:20 - 15:40 Motion Interpolation with Bennett Biarcs
H-P. Schröcker, B. Jüttler

15:40 - 16:00 Motion Estimation using a Statistical Solid Dynamic Method
A. Wolf, M. Senesh

16:00 - 16:20 Spatial Generalization of the Planar Path Generation Problem
C. Huang, B. Huang

16:20 - 16:40 Motion Planning of Nonholonomic Systems with Dynamics
K. Tchoń, J. Jakubiak, L. Malek

16:40 - 17:00 Coffee Break

17:00 - 18:00 Numerical Methods

Chair: F. Thomas

17:00 - 17:20 Fast Distance Computation Using Quadratically Supported Surfaces
M. Rabl, B. Jüttler

17:20 - 17:40 On the Computation of the Home Posture of the McGill Schönflies-Motion Generator
D. Alizadeh, J. Angeles, S. Nokleby

17:40 - 18:00 Hardware-in-the-Loop Simulation of Constraint Elements in Mechanical Systems
M. Kähler, C. Woernle, R. Bader

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Thursday, May 7, 2009

8:30 - 9:00 Registration

9:00 - 10:20 Geometrical Methods Chair: M. Husty

9:00 - 9:20 Explicit Algebraic Solution of Geometrically Simple Serial Manipulators
M. Pfurner

9:20 - 9:40 3R Wrist Positioning – a Classical Problem and its Geometric Background
P. Zsombor-Murray, A. Gfrerrer

9:40 - 10:00 A Geometric Newton-Raphson Method for Gough-Stewart Platforms
J.M. Selig, H. Li

10:00 - 10:20 Aspects of Clifford Algebra for Screw Theory
J. Rooney

10:20 - 10:40 Coffee Break

10:40 - 12:00 Synthesis (1) Chair: P. Fanghella

10:40 - 11:00 Uncoupled 6-DOF Tripods via Group Theory
C.-C. Lee, J.M. Hervé

11:00 - 11:20 Application of Higher Order Derivatives in the Synthesis of Crank and Cam Mechanisms
H. Lederer, G. Lonij, B. Corves

11:20 - 11:40 Interactive Design of a Robotic Gripper System with the Geometry Program "GECKO"
G. Lonij, S.W. Choi, B. Corves

11:40 - 12:00 Kinematical Solution by Structural Approximation
P. Kukula, M. Valasek

12:00 -14:00 Lunch Break

14:00 - 15:20 Synthesis (2) Chair: J. Rooney

14:00 - 14:20 The Axis Constraint Equation and a General 6R Double-Spherical Overconstrained Mechanism
L. Cui, J.S. Dai

14:20 - 14:40 Two Methods for Force Balancing of Bennett Linkages
B. Moore, J. Schicho

14:40 - 15:00 Regular Polygonal and Regular Spherical Polyhedral Linkages Comprising Bennett Loops
G. Kiper, E. Söylemez

15:00 - 15:20 Kinematic Analysis of an Adjustable Slider-Crank Mechanism
D. Mundo, G. Gatti, G. Danieli, D.B. Dooner

15:20 - 15:40 Coffee Break

15:40 - 16:40 Biomechanics Chair: V. Parenti-Castelli

15:40 - 16:00 Improving Marker Based Inverse Kinematics Solutions for Under-Determined Spinal Models
C. Simonidis, W. Seemann

16:00 - 16:20 Kinematical Analysis and Design of a New Surgical Parallel Robot
D. Pisla, N. Plitea, B. Gherman, A. Pisla, C. Vaida

16:20 - 16:40 Design Improvements on a Carotid Blood Flow Measurement System
G. Carbone, R. Nakadate, J. Solis, M. Ceccarelli, A. Takanishi, E. Minagawa, M. Sugawara, K. Niki

16:40 - 17:00 Coffee Break

17:00 - 18:00 Design Issues Chair: Ch. Huang

17:00 - 17:20 A New Procedure for the Optimization of a Dielectric Elastomer Actuator
R. Vertechy, G. Berselli, V. Parenti Castelli, G. Vassura

17:20 - 17:40 Light-Weight High Dynamic Camera Orientation System
T. Villgratner, T. Thümmel, H. Ulbrich

17:40 - 18:00 Dynamic Balancing of Clavel's Delta Robot
V. van der Wijk, J.L. Herder

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Friday, May 8, 2009

8:30 - 9:00 Registration

9:00 - 10:20 **Singularities** **Chair: J. Selig**

9:00 - 9:20 Singularity Analysis of a 3 Degrees-of-Freedom Parallel Manipulator
S. Pastorelli, A. Battezzato

9:20 - 9:40 Branching Singularities in Kinematotropic Parallel Mechanisms
G. Gogu

9:40 - 10:00 A new Approach to the Classification of Architecturally Singular Parallel Manipulators
G. Nawratil

10:00 - 10:20 Straightening-Free Algorithm for the Singularity Analysis of Stewart-Gough Platforms with Collinear/Coplanar Attachments
J. Borras, F. Thomas, C. Torras

10:20 - 10:40 Coffee Break

10:40 - 11:40 **Gears & Inverse Kinematics** **Chair: B. Corves**

10:40 - 11:00 A Computational Approach for the Evaluation of Single d.o.f. Planetary Gear Efficiency
P. Fanghella

11:00 - 11:20 The Computational Fundamentals of Spatial Cycloidal Gearing
G. Figliolini, H. Stachel, J. Angeles

11:20 - 11:40 Inverse Kinematics and Motion Simulation of a 2-DOF Parallel Manipulator with 3-PUP Legs
E. Rodriguez-Leal, J.S. Dai, G.R. Pennock