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Welcome to the CCToMM09 CD.

This CD contains the final papers of the Canadian Committee for the Theory of Machines and Mechanisms (CCToMM) 2009 Symposium. You can access the papers by browsing either the **Author Index** or the **Programme**.

What is CCToMM ?

The Canadian Committee for the Theory of Machines and Mechanisms (CCToMM) was formally recognized as a national committee member of the International Federation for the Theory of Machines and Mechanisms (IFTToMM) at the Third World Congress on Theory of Machines and Mechanisms, held in Dubrovnik in 1971. CCToMM, as a national committee member of IFTToMM, shares the objectives of the latter, namely, the promotion of the development in the field of machines and mechanisms by theoretical and experimental research and its applications to practice. (Art. 2.1 of the IFTToMM Constitution)

The field of interest to CCToMM being so broad, including various subfields of special interest to IFTToMM namely,

- Computer-Aided Design Methods
- Dynamics of Machine Systems
- Gears and Power Transmissions
- Robots and Manipulators
- Mechatronics
- Micromechanisms

Our Partners

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Programme - CCToMM M³ Symposium 2009

Jeudi, 28 mai 2009 (11 ARTICLES)

8 :00 – 8 :40	Inscription
8 :40 – 9 :40	<p>Ouverture du Symposium (5 min) & Discours #1.</p> <p>Applied Robotics for the Power Industry : Hydro-Quebec's Experience Speaker : Dr. Serge Montambault, ing. Chargé de projet d'innovation technologique, robotique et civil, Institut de Recherche d'Hydro-Québec (IREQ)</p>
9 :40 – 10 :40	<p>Session 1 : Contrôle des Manipulateurs (3 ARTICLES) Présidence de session : Prof. József Kövecses (McGill University)</p> <p>CCToMM09-P07 Experimental investigation on the vibration control of a parallel manipulator with multiple smart flexible links Xuping Zhang, James K. Mills and William L. Cleghorn</p> <p>CCToMM09-P24 Further results on the zeros of a single rigid-flexible link manipulator Mohammad Vakil, Reza Fotouhi and Peter N. Nikiforuk</p> <p>CCToMM09-P26 MIMO sliding-mode and H∞ controller design for dynamic coupling reduction in underwater-manipulator systems Serdar Soylu, Braley J. Buckham and Ron P. Podhorodeski</p>
10 :40 – 11 :00	Pause Café
11 :00 – 12 :20	<p>Session 2 : Dynamique (4 ARTICLES) Présidence de session : Prof. Jorge Angeles (McGill University)</p> <p>CCToMM09-N01 On the use of impulsive bilateral constraints to characterize topology transitions Josep M. Font-Llagunes and József Kövecses</p> <p>CCToMM09-P06 A volume-based contact dynamics model with asymmetric damping independent of the coefficient of restitution André Roy and Juan A. Carretero</p> <p>CCToMM09-P04 Mechanical integrators for the inverse dynamics of dissipative multibody systems Stefan Uhlar and Peter Betsch</p> <p>CCToMM09-P01 Fuzzy logic-based inverse dynamic modelling of parallel manipulators Meysar Zeinali and Leila Notash</p>
12 :20 – 13 :40	Dîner
13 :40 – 15 :00	<p>Session 3 : Conception et Implémentation (4 ARTICLES) Présidence de session : Prof. Leila Notash (Queen's University)</p> <p>CCToMM09-P05 Modelling and simulation of the testbed for a pitch-roll wrist prototype based on spherical cam-rollers Xiao Qing Ma, Vikram Chopra, Jorge Angeles and Martin Asger Haugaard</p> <p>CCToMM09-P18 Path planning for robot-assisted rapid prototyping of ice structures Alessandro Ossino, Eric Barnett, Jorge Angeles, Damiano Pasini and Pieter Sijpkes</p> <p>CCToMM09-P21 Design and implementation of an indoor localization system for the omnibot omni-directional platform Sasha Ginzburg, Florentin von Frankenberg and Scott Nokleby</p> <p>CCToMM09-P22 Development of a composite-based long reach robotic arm Darrin Willis, Scott Nokleby and Remon Pop-Iliev</p>
15 :00 – 15 :10	<p>Annonce Spéciale ASC : Programme d'appui aux partenariats Conférencier : Dr. Christian Lange</p>
15 :10 – 15 :15	Pause Café
15 :15 – 16 :45	Assemblée Générale Annuelle
17 :30 – 19 :30	Activité (Visite du Vieux-Québec)
19 :30 – 23 :00	Souper du Symposium (Aux Anciens Canadiens)

Vendredi, 29 mai 2009 (15 ARTICLES)

8 :40 – 9 :40	<p>Discours #2.</p> <p>Robotics research at DRDC and Military Operations Conférencier : Benoit Ricard, ing, M.Sc.A. Scientifique de la défense, Groupe capteurs collaboratifs, adaptatifs et autonomes Recherche et Développement pour la Défense Canada Ministère Défense Nationale</p>
9 :40 – 10 :40	<p>Session 4 : Calibration et Interaction humain-robot (3 ARTICLES) Présidence de session : Prof. Luc Baron (École Polytechnique de Montréal)</p> <p>CCToMM09-P11 Pose selection for the kinematic calibration of a prototyped 4 degrees of freedom manipulator Andrew Horne and Leila Notash</p> <p>CCToMM09-P23 Development of a human-body dynamic model for paraplegics wearing an ambulatory exoskeleton Flavio Firmani and Edward Park</p> <p>CCToMM09-P10 Determination of the workspace of a 3PRPR parallel mechanism for human-robot collaboration Alexandre Lecours and Clément M. Gosselin</p>
10 :40 – 11 :00	<p>Pause Café</p>
11 :00 – 12 :20	<p>Session 5 : Synthèse des Manipulateurs (4 ARTICLES) Présidence de session : Prof. Ron P. Podhorodeski (University of Victoria)</p> <p>CCToMM09-P14 Topological synthesis of translational parallel manipulators Xiaoyu Wang and Luc Baron</p> <p>CCToMM09-P20 Isotropie des manipulateurs parallèles de la classe H4 Benoit Rousseau and Luc Baron</p> <p>CCToMM09-P15 Geometric synthesis of planar 3-RPR parallel mechanisms for singularity-free workspace Qimi Jiang and Clément M. Gosselin</p> <p>CCToMM09-P12 Algorithme génétique multicritériel pour l'optimisation de l'architecture des mécanismes entraînés par câbles - Application à un simulateur de vol Catherine Leclerc and Clément M. Gosselin</p>
12 :20 – 13 :40	<p>Dîner</p>
13 :40 – 15 :00	<p>Session 6 : Manipulateurs Parallèles Actionnée par Câbles (4 ARTICLES) Présidence de session : Prof. Roger Boudreau (Université de Moncton)</p> <p>CCToMM09-P08 A planar closed-loop cable-driven parallel mechanism Hanwei Liu and Clément M. Gosselin</p> <p>CCToMM09-P02 Workspace envelope formulation of planar wire-actuated parallel manipulators Derek McColl and Leila Notash</p> <p>CCToMM09-P19 Approximate static balancing of a planar parallel cable-driven mechanism Simon Perreault and Philippe Cardou</p> <p>CCToMM09-P03 Redundancy resolution of wire-actuated parallel manipulators Maryam Agahi and Leila Notash</p>
15 :00 – 15 :15	<p>Pause Café</p>
15 :20 – 16 :40	<p>Session 7 : Redondance Cinématique (4 ARTICLES) Présidence de session : Prof. Scott Nokleby (Univ. of Ontario Institute of Technology)</p> <p>CCToMM09-P17 Kinematic analysis of the 3-PRPR redundant planar parallel manipulator Maurizio Ruggiu and Juan A. Carretero</p> <p>CCToMM09-P13 Dexterous workspace of a general geometry 3-PRRR kinematically redundant planar parallel manipulator A. Gallant, Roger A. Boudreau and Marise Gallant</p> <p>CCToMM09-P16 Manipulateur sériel 6R sphérique isotrope pour toute orientation de l'effecteur Khaled Akrouf, Luc Baron and Xiaoyu Wang</p> <p>CCToMM09-P09 Obstacle avoidance of redundant discretely-actuated manipulators using workspace density functions Eric Lanteigne and Amor Jnifene</p>
16 :40 – 17 :00	<p>Clôture du Symposium</p>



Programme - CCToMM M³ Symposium 2009

Thursday, May 28, 2009 (11 PAPERS)

8 :00 – 8 :40	Registration
8 :40 – 9 :40	<p>Opening of the Symposium (5 min) & Keynote lecture 1.</p> <p>Applied Robotics for the Power Industry : Hydro-Quebec's Experience Speaker : Dr. Serge Montambault, ing. Chargé de projet d'innovation technologique, robotique et civil, Institut de Recherche d'Hydro-Québec (IREQ)</p>
9 :40 – 10 :40	<p>Session 1 : Manipulator Control (3 PAPERS) Session Chair : Prof. József Kövecses (McGill University)</p> <p>CCToMM09-P07 Experimental investigation on the vibration control of a parallel manipulator with multiple smart flexible links Xuping Zhang, James K. Mills and William L. Cleghorn</p> <p>CCToMM09-P24 Further results on the zeros of a single rigid-flexible link manipulator Mohammad Vakil, Reza Fotouhi and Peter N. Nikiforuk</p> <p>CCToMM09-P26 MIMO sliding-mode and H∞ controller design for dynamic coupling reduction in underwater-manipulator systems Serdar Soyly, Braley J. Buckham and Ron P. Podhorodeski</p>
10 :40 – 11 :00	Coffee break
11 :00 – 12 :20	<p>Session 2 : Dynamics (4 PAPERS) Session Chair : Prof. Jorge Angeles (McGill University)</p> <p>CCToMM09-N01 On the use of impulsive bilateral constraints to characterize topology transitions Josep M. Font-Llagunes and József Kövecses</p> <p>CCToMM09-P06 A volume-based contact dynamics model with asymmetric damping independent of the coefficient of restitution André Roy and Juan A. Carretero</p> <p>CCToMM09-P04 Mechanical integrators for the inverse dynamics of dissipative multibody systems Stefan Uhlar and Peter Betsch</p> <p>CCToMM09-P01 Fuzzy logic-based inverse dynamic modelling of parallel manipulators Meysar Zeinali and Leila Notash</p>
12 :20 – 13 :40	Lunch
13 :40 – 15 :00	<p>Session 3 : Design and Implementation (4 PAPERS) Session Chair : Prof. Leila Notash (Queen's University)</p> <p>CCToMM09-P05 Modelling and simulation of the testbed for a pitch-roll wrist prototype based on spherical cam-rollers Xiao Qing Ma, Vikram Chopra, Jorge Angeles and Martin Asger Haugaard</p> <p>CCToMM09-P18 Path planning for robot-assisted rapid prototyping of ice structures Alessandro Ossino, Eric Barnett, Jorge Angeles, Damiano Pasini and Pieter Sijpkes</p> <p>CCToMM09-P21 Design and implementation of an indoor localization system for the omnibot omni-directional platform Sasha Ginzburg, Florentin von Frankenberg and Scott Nokleby</p> <p>CCToMM09-P22 Development of a composite-based long reach robotic arm Darrin Willis, Scott Nokleby and Remon Pop-Iliev</p>
15 :00 – 15 :10	<p>Special Announcement CSA Partnerships Support Program Speaker : Dr. Christian Lange</p>
15 :10 – 15 :15	Coffee break
15 :15 – 16 :45	Annual General Meeting
17 :30 – 19 :30	Social event (Tour of the old town)
19 :30 – 23 :00	Symposium Dinner (Aux Anciens Canadiens)

Friday, May 29, 2009 (15 PAPERS)

8 :40 – 9 :40	<p>Keynote lecture 2.</p> <p>Robotics research at DRDC and Military Operations Speaker : Benoit Ricard, ing, M.Sc.A. Scientifique de la défense, Groupe capteurs collaboratifs, adaptatifs et autonomes Recherche et Développement pour la Défense Canada Ministère Défense Nationale</p>
9 :40 – 10 :40	<p>Session 4 : Calibration and Human-robot interaction (3 PAPERS) Session Chair : Prof. Luc Baron (École Polytechnique de Montréal)</p> <p>CCToMM09-P11 Pose selection for the kinematic calibration of a prototyped 4 degrees of freedom manipulator Andrew Horne and Leila Notash</p> <p>CCToMM09-P23 Development of a human-body dynamic model for paraplegics wearing an ambulatory exoskeleton Flavio Firmani and Edward Park</p> <p>CCToMM09-P10 Determination of the workspace of a 3PRPR parallel mechanism for human-robot collaboration Alexandre Lecours and Clément M. Gosselin</p>
10 :40 – 11 :00	Coffee break
11 :00 – 12 :20	<p>Session 5 : Manipulator synthesis (4 PAPERS) Session Chair : Prof. Ron P. Podhorodeski (University of Victoria)</p> <p>CCToMM09-P14 Topological synthesis of translational parallel manipulators Xiaoyu Wang and Luc Baron</p> <p>CCToMM09-P20 Isotropie des manipulateurs parallèles de la classe H4 Benoit Rousseau and Luc Baron</p> <p>CCToMM09-P15 Geometric synthesis of planar 3-RPR parallel mechanisms for singularity-free workspace Qimi Jiang and Clément M. Gosselin</p> <p>CCToMM09-P12 Algorithme génétique multicritériel pour l'optimisation de l'architecture des mécanismes entraînés par câbles - Application à un simulateur de vol Catherine Leclerc and Clément M. Gosselin</p>
12 :20 – 13 :40	Lunch
13 :40 – 15 :00	<p>Session 6 : Wire Actuated Parallel Manipulators (4 PAPERS) Session Chair : Prof. Roger Boudreau (Université de Moncton)</p> <p>CCToMM09-P08 A planar closed-loop cable-driven parallel mechanism Hanwei Liu and Clément M. Gosselin</p> <p>CCToMM09-P02 Workspace envelope formulation of planar wire-actuated parallel manipulators Derek McColl and Leila Notash</p> <p>CCToMM09-P19 Approximate static balancing of a planar parallel cable-driven mechanism Simon Perreault and Philippe Cardou</p> <p>CCToMM09-P03 Redundancy resolution of wire-actuated parallel manipulators Maryam Agahi and Leila Notash</p>
15 :00 – 15 :15	Coffee break
15 :20 – 16 :40	<p>Session 7 : Kinematic Redundancy (4 PAPERS) Session Chair : Prof. Scott Nokleby (Univ. of Ontario Institute of Technology)</p> <p>CCToMM09-P17 Kinematic analysis of the 3-PRPR redundant planar parallel manipulator Maurizio Ruggiu and Juan A. Carretero</p> <p>CCToMM09-P13 Dexterous workspace of a general geometry 3-PRRR kinematically redundant planar parallel manipulator A. Gallant, Roger A. Boudreau and Marise Gallant</p> <p>CCToMM09-P16 Manipulateur sériel 6R sphérique isotrope pour toute orientation de l'effecteur Khaled Akrouf, Luc Baron and Xiaoyu Wang</p> <p>CCToMM09-P09 Obstacle avoidance of redundant discretely-actuated manipulators using workspace density functions Eric Lanteigne and Amor Jnifene</p>
16 :40 – 17 :00	Closing of the Symposium