

5th IFAC Workshop on Lagrangian and Hamiltonian Methods for Non Linear Control (LHMNLC 2015)

IFAC PapersOnline Volume 48, Issue 13

Lyon, France
4-7 July 2015

Editor:

Yann Le Gorrec

ISBN: 978-1-5108-1822-4

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2015) by Elsevier Limited
All rights reserved.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
360 Park Ave South
New York, NY 10010

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Alternative Passive Maps for Infinite-Dimensional Systems Using Mixed-Potential Functions	1
<i>Krishna Chaitanya Kosaraju, Ramkrishna Pasumarthy, Dimitri Jeltsema</i>	
Stability Condition of Discrete-time Linear Hamiltonian Systems with Time-varying Delay Feedback Interconnection	7
<i>Said Aoues, Warody Lombardi, Damien Eberard, Michael Di-Loreto</i>	
Port-Hamiltonian Formulation of the Gradient Method Applied to Smart Grids.....	13
<i>T. W. Stegink, C. De Persis, A. J. Van Der Schaft</i>	
Flatness of Mechanical Systems with 3 Degrees of Freedom.....	19
<i>Florentina Nicolau, Witold Respondek</i>	
Flatness and Realization of Virtual Holonomic Constraints in Lagrangian Systems	25
<i>Sergej Celikovský</i>	
Port-Hamiltonian Modelling for Buckling Control of a Vertical Flexible Beam with Actuation at the Bottom	31
<i>Megha V. Trivedi, Ravi N. Banavar, Paul Kotyczka</i>	
On Port-Hamiltonian Modeling and Control of Quaternion Systems.....	39
<i>Kenji Fujimoto, Tomoya Takeuchi, Yuki Matsumoto</i>	
Widening the Effect of Lie Bracket Motion: A Semi-global Approximation and Control for Nonholonomic Systems Using Non-power Series Expansion	45
<i>Tetsuro Hirano, Masato Ishikawa</i>	
Quasi-Optimal Regulators for Nonholonomic Systems Driven by Rough Paths.....	51
<i>Yûki Nishimura</i>	
Input and Plant Parameter Optimization Via Learning Optimal Control of Hamiltonian Systems	57
<i>Satoshi Satoh, Kenji Fujimoto, Masami Saeki</i>	
Formation Control of Nonholonomic Wheeled Robots in the Presence of Matched Input Disturbances	63
<i>Ewoud Vos, Matin Jafarian, Claudio De Persis, Jacquélien M. A. Scherpen, Arjan J. Van Der Schaft</i>	
Port-hamiltonian Based Teleoperation of a Multi-robot System on Periodic Trajectories	69
<i>C. Secchi, L. Sabattini, C. Fantuzzi</i>	
Complexification of Dirac Structures and Generalised Kirchhoff Operators	75
<i>Dimitri Jeltsema, Arjan Van Der Schaft</i>	
A Comparison of Vakonomic and Nonholonomic Dynamics for Systems on Lie Groups	81
<i>Michał Józwiowski, Witold Respondek</i>	
Higher-Order Constrained Variational Problems on Principal Bundles with Applications to Optimal Control of Underactuated Systems.....	87
<i>Leonardo Colombo, Rohit Gupta, Anthony Bloch</i>	
Energy Shaping for the Robust Stabilization of a Wheeled Inverted Pendulum.....	93
<i>Sergio Delgado, Paul Kotyczka</i>	
Control by Interconnection of Distributed Port-Hamiltonian Systems Beyond the Dissipation Obstacle	99
<i>Alessandro Macchelli, Luis Pablo Borja, Romeo Ortega</i>	
Image-based Visual Servo Control Using the Port-Hamiltonian Approach	105
<i>Mauricio Muñoz-Arias, Mohamed I. El-Hawwary, Jacquélien M. A. Scherpen</i>	
Stability and Consensus of Electrical Circuits via Structural Properties	111
<i>Sofía Avila-Becerril, Gerardo Espinosa-Pérez, Paul Fernández-Carrillo</i>	
Port-Hamiltonian Model for DC-microgrid Lift Systems	117
<i>T. Hung Pham, I. Prodan, D. Genon-Catalot, L. Lefèvre</i>	
Dissipation Obstacle Hampers Control—by—Interconnection Methodology.....	123
<i>Meng Zhang, Romeo Ortega, Dimitri Jeltsema, Hongye Su</i>	
Passivity-Based Tracking Controllers for Mechanical Systems with Active Disturbance Rejection.....	129
<i>Jose Guadalupe Romero, Alejandro Donaire, David Navarro-Alarcon, Victor Ramirez</i>	
Passivity-based Control of Multi-terminal HVDC Systems Under Control Saturation Constraints.....	135
<i>Arnau Dòria-Cerezo, Josep M. Olm, Jacquélien M. A. Scherpen</i>	
Towards a Potential-based Analysis of Reacting Systems.....	141
<i>Nicolas Hudon, N. Ha Hoang, Juan Paulo Garcia-Sandoval, Denis Dochain</i>	
Stabilization of Control Contact Systems	144
<i>Li Wang, B. Maschke, A. J. Van Der Schaft</i>	
Dissipative Boundary Control Systems with Application to an Isothermal Tubular Reactor	150
<i>W. Zhou, B. Hamroun, Y. Le Gorrec, F. Couenne</i>	

Entropy-based Control of Continuous Fluidized Bed Spray Granulation Processes	154
<i>Stefan Palis, Andreas Bück, Achim Kienle</i>	
Hamiltonian Feedback Design for Mass Action Law Chemical Reaction Networks	158
<i>György Lipták, Gábor Szederkényi, Katalin M. Hangos</i>	
Port-Hamiltonian Formulation of Rigid-Body Attitude Control	164
<i>Paolo Forni, Dimitri Jeltsema, Gabriel A. D. Lopes</i>	
Morphological Computation in a Fast-running Quadruped with Elastic Spine	170
<i>Gerrit A. Folkertsma, Arjan J. Van Der Schaft, Stefano Stramigioli</i>	
Dynamical Analysis of Spherical Mobile Robot Utilizing Off-Centered Internal Mass Distribution	176
<i>Y. Furuse, T. Hirano, M. Ishikawa</i>	
Matrix-valued Impedances with Fractional Derivatives and Integrals in Boundary Feedback Control: A Port-Hamiltonian approach	182
<i>Yann Le Gorrec, Denis Matignon</i>	
Control of a Flexible Spacecraft Using Discrete IDA-PBC Design	188
<i>Said Aoues, Denis Matignon, Daniel Alazard</i>	
Feedforward Control of a Channel Flow Based on a Discretized Port-Hamiltonian Model	194
<i>Paul Kotyczka, Antonio Blancato</i>	
Nonlinear Damping Models for Linear Conservative Mechanical Systems with Preserved Eigenspaces: A Port-Hamiltonian Formulation	200
<i>Thomas Hélie, Denis Matignon</i>	
Power Preserving Model Reduction of 2D Vibro-Acoustic System: A Port Hamiltonian Approach	206
<i>Yongxin Wu, Boussad Hamroun, Yann Le Gorrec, Bernhard Maschke</i>	
The Piston Problem in a Port-Hamiltonian Formalism	212
<i>Julien Lequeurre, Marius Tucsnak</i>	
Modeling of a Fluid-structure Coupled System Using Port-Hamiltonian Formulation	217
<i>Flávio Luiz Cardoso-Ribeiro, Denis Matignon, Valérie Pommier-Budinger</i>	
Explicit Second-order Accurate Method for the Passive Guaranteed Simulation of Port-Hamiltonian Systems	223
<i>N. Lopes, T. Hélie, A. Falaize</i>	
Zero Dynamics for Waves on Networks	229
<i>Birgit Jacob, Kirsten Morris, Hans Zwart</i>	
A Port-Hamiltonian Formulation of a 2D Boundary Controlled Acoustic System	235
<i>Vincent Trenchant, Yassine Fares, Hector Ramirez, Yann Le Gorrec, Morvan Ouisse</i>	
Using System Theory and Energy Methods to Prove Existence of Non-Linear PDE's	241
<i>Hans Zwart</i>	
Port-Hamiltonian Formulation for Higher-order PDEs	244
<i>M. Schöberl, K. Schlacher</i>	
Nonlinear Optimal Control in Catalytic Process via Stable Manifold Method	250
<i>Kenichi Hamaguchi, Gou Nishida, Noboru Sakamoto, Yutaka Yamamoto</i>	
Author Index	