

IFAC Workshop on Control Applications of Optimization 2009

**Jyvaskyla, Finland
6-8 May 2009**

Editors:

Kaisa Miettinen

Pekka Neittaanmaki

ISBN: 978-1-61738-781-4

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© (2009) by the International Federation of Automatic Control (IFAC)
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact the publisher, International Federation of Automatic Control (IFAC) at the address below.

IFAC Secretariat
Schlossplatz 12
A-2361 Laxenburg
Austria

Phone: +43 2236 71 447
Fax: +43 2236 72 859

secretariat@ifac-control.org

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

CONTENTS

Keynote papers

Hamiltonian Potential Functions for Differential Game

Davide Dragone, Luca Lambertini, George Leitmann, Arsen Palestini 1

Algorithms for Solving Stochastic Discrete Control Problems with Finite Time Horizon

Dmitrii Lozovanu, Stefan Pickl 9

Robust control and stabilisation 1

Robust approximate tracking of matched disturbance non - control affine systems

P. Ortner, E. Gruenbacher, L. del Re 17

Smooth stabilization and optimal H2 design

Joris Vanbiervliet, Wim Michiels, Stefan Vandewalle 23

Robust control optimization for thermo-energetic installations

Tudor-Bogdan Airimițoae, Dumitru Popescu, Cătălin Dimon, Grigore Stămătescu, 29

Numerical methods in optimization

Novel method to control linear systems of acceleration constrained dynamics

Josef Shinar, Valery Y. Glizer, Vladimir Turetsky 35

A reduction type penalty algorithm for nonlinear semi-infinite programming

Alzira Mota, A. Ismael F. Vaz 40

Using particle swarm optimization for reduced order H_∞ synthesis

G. Sandou, G. Duc 46

A multi-quantile approach for open-loop stochastic dynamic programming problems

Rodrigo T. N. Cardoso, Ricardo H. C. Takahashi, Frederico R. B. Cruz, Carlos M. Fonseca 52

Applications in environmental sciences, economics and management 1

Economic growth with political lobbying and wage bargaining

Tapio Palokangas 58

Model of quality competition with a non-uniform consumer distribution

Margarita A. Gladkova, Nikolay A. Zenkevich 64

High-precision algorithms for constructing optimal trajectories via solving Hamiltonian systems

Andrey A. Krasovskii, Alexander M. Tarasyev 70

Regulating environmental externalities through public firms: A differential game

Davide Dragone, Luca Lambertini, Arsen Palestini 76

On turnpike solutions of some optimal growth problems

Amos Zemel, Ben Gurion 82

Optimal PDE control 1

- A posteriori error estimates for optimal control problems**
Sergey I. Repin 85

Model-predictive control

- Nonlinear model predictive control of a diesel engine airpath**
P. Ortner, R. Bergmann, H. J. Ferreau, L. del Re 91
- Model predictive control for linear parameter varying systems using path-dependent Lyapunov functions**
Marc Jungers, Rodrigo P. Caun, Ricardo C. L. F. Oliveira, Pedro L. D. Peres 97

Stochastic optimization

- A moving horizon approach to a chance constrained nonlinear dynamic optimization problem**
Abebe Geletu, Michael Klöppel, Pu Li, Armin Hoffmann 103
- Regulator design using a multiobjective genetic algorithm**
Fredrik Östman, Frank Pettersson, Hannu T. Toivonen 108

Optimal PDE control 2

- An advanced criterion for optimal actuator and sensor placement on complex flexible structures**
Christian Westermayer, Alexander Schirrer, Mark Hemedi, Martin Kozek 114
- Error estimates for the solution of a control constrained optimal control problem with interior penalties**
Felipe Álvarez, Jérôme Bolte, J. Frédéric Bonnans, Francisco J. Silva 120
- Finite and infinite transmission zeros for infinite-dimensional systems**
Petteri Laakkonen, Seppo Pohjolainen 124
- A less problem dependent approach for optimal trajectories with singular arcs: Application to space launchers**
P. Martinon, F. Bonnans, E. Trélat 130

Differential games 1

- On the notion of stability defect in game control problems**
Vladimir N. Ushakov, Yaroslav A. Latushkin 135
- On the value function of a differential game with simple dynamics and piecewise linear data**
Lyubov G. Shagalova 140
- Matrix block formulation for closed-loop memoryless discrete-time Nash solution**
Marc Jungers, Hisham Abou-Kandil 144
- Open-loop Stackelberg strategy for linear quadratic games via matrix pencil approach**
Marc Jungers, Hisham Abou-Kandil, Cristian Oara, Radu Stefan 150

Applications in environmental sciences, economics and management 2

- Non-renewable resources and the sustainability of the economic growth under bilateral trade**
Francisco Cabo, Guiomar Martín-Herrán, María Pilar Martínez-García 156

Multistage dynamics of international environmental agreements: free-riding from membership and compliance	
<i>Yulia Pavlova</i>	162
The compleat fish wars with changing area for fishery	
<i>Vladimir V. Mazalov, Anna N. Rettieva</i>	168
Optimal dynamics of functionality development in open innovation	
<i>C. Watanabe, J. Shin, J. Heikkinen, A. Tarasyev</i>	173
Robust control and stabilisation 2	
Power generation/distribution control systems topology selection based on robustness evaluation	
<i>Jozef B. Lewoc, Antoni Izworski, Slawomir Skowronski, Antonina Kieleczawa, Georgi Dimirovski</i>	179
Delay-dependent stability analysis of neutral systems using positive polynomials optimization	
<i>Bogdan Dumitrescu, Bogdan C. Şicleru, Radu Ştefan</i>	185
Differential games 2	
0035 Extension of a problem of the game control	
<i>A.G. Chentsov, Ju.V. Shapar</i>	189
0036 A numerical construction algorithm of Nash and Stackelberg solutions for two-person non-zero sum linear positional differential games	
<i>Anatolii F. Kleimenov, Sergei I. Osipov, Dmitry R. Kuvshinov</i>	193
Reconstruction of differential games with Bolza payoff	
<i>Yurii Averboukh</i>	199
A necessary and sufficient condition for the existence of value for positional differential game	
<i>Sergei Chistyakov, Fedor Nikitin</i>	207
Adaptive control	
A new exterior-point approach to a fixed-order output feedback controller design	
<i>Yasushi Kami, Eitaku Nobuyama</i>	211
A simulator for infinite-dimensional systems with a self-tuning controller	
<i>Markku Åkerblom, Timo Hämäläinen, Seppo Pohjolainen</i>	216
NPP APCS diagnostics implementation as a routine task of APCS	
<i>V.G. Promyslov, S.I. Masolkin</i>	221
Optimal control 1	
Optimization of certain mobile robotic systems	
<i>Felix L. Chernousko</i>	226
The synthesis of optimal control system by the network operator method	
<i>Askhat I. Diveev, Elena A. Sofronova</i>	232

Optimization methods

Dynamic equilibrium model for spatial auction markets
Elisabetta Allevi, Brescia University, Adriana Gnudi, Igor V. Konnov 238

Direct fire target selection in Sandis combat simulation
Esa Lappi, Risto Bruun, Kosti Jokinen 242

Optimization problems for distribution of resources in spatial systems
Igor V. Konnov, Olga A. Kashina, Erkki Laitinen 246

Applications in environmental sciences, economics and management 3

Nonlinear stabilizers of economic growth under exhausting energy resources
Robert U. Ayres, Andrey A. Krasovskii, Alexander M. Tarasyev 251

Closed loop dynamic optimization of a petroleum refinery process
M. Aho, S. Bergman, L. Hammarström, K. Yli-Opas, A. Pelkola, M. Sourander 257

Optimization of the pulp mill economical efficiency; Study on the behavior effect of the economically significant variables
A. Zakharov, S.-L. Jämsä-Jounela 263

Optimal control 2

Receding horizon optimal control of Wiener systems by application of an asymmetric cost function
Daniel Alberer, Harald Kirchsteiger, Luigi del Re, Hans Joachim Ferreau, Moritz Diehl 269

An algorithm for solving discrete optimal control problems with Infinite time horizon - Determining the minimal mean cost cycles in a directed graph
Dmitrii Lozovanu, Stefan Pickl 275

Multiobjective optimization I

An open-loop invariant-set approach for multiobjective dynamic programming problems
Rodrigo T. N. Cardoso, Ricardo H. C. Takahashi, Carlos M. Fonseca 29:

Multi-objective design with a stochastic validation of vaccination campaigns
André R. da Cruz, Rodrigo T. N. Cardoso, Ricardo H. C. Takahashi 286

Multiple objective optimisation of cyclic chemical systems with distributed parameters
Filip Logist, Jan F. Van Impe 292

Optimization with uncertainties

Viscosity solutions to hereditary dynamical optimization
Nikolay Yu. Lukoyanov 4; 8

On the optimal risk function for the system under dynamic disturbances
Dmitry A. Serkov 304

Recursive state estimation for linear non-causal descriptor systems with uncertain parameters
Sergiy M. Zhuk, Taras Shevchenko 307

Optimal control 3

The method of characteristics in solving of optimal control problems with terminal cost
N. Subbotina, E. Kolpakova 312

Optimal guidance law: impact angle & terminal lateral acceleration control
Chang-Kyung Ryoo., H. Jin Kim, Min-Jea Tahk, Jin-Ik Lee 338

Multiobjective optimization 2

Stability analysis for a parameterized multicriteria Boolean linear programming problem
Yury Nikulin, Marko M. Mäkelä 323

Multistage optimisation strategy for solving production planning problems
R. Küttner, J. Majak 349

Towards understanding evolutionary bilevel multi-objective optimization algorithm
Ankur Sinha, Kalyanmoy Deb 335

Consistency and pole assignment in linear systems with incomplete feedback
Vasili A. Zaitsev 33;