

2019 22nd International Conference on Process Control (PC19)

**Strbske Pleso, Slovakia
11 – 14 June 2019**



**IEEE Catalog Number: CFP19PCB-POD
ISBN: 978-1-7281-3759-9**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP19PCB-POD
ISBN (Print-On-Demand):	978-1-7281-3759-9
ISBN (Online):	978-1-7281-3758-2

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) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

HANDLING PLANT-MODEL MISMATCH USING MULTI-STAGE NMPC WITH MODEL-ERROR MODEL	1
<i>Sakthi Thangavel ; Sebastian Engell</i>	
ROBUST EVENT-TRIGGERED NETWORKED MPC WITH ACTIVE SET UPDATES	7
<i>Patrik Berner ; Kai König ; Michal Kvasnica ; Martin Mönnigmann</i>	
MODEL PREDICTIVE CONTROL OF BUILDING HVAC SYSTEM EMPLOYING ZONE THERMAL ENERGY REQUESTS	13
<i>Nikola Hure ; Anita Martincevic ; Mario Vašak</i>	
MIMICKING PREDICTIVE CONTROL WITH NEURAL NETWORKS IN DOMESTIC HEATING SYSTEMS	19
<i>Yannik Löhr ; Martin Mönnigmann ; Martin Klauco ; Martin Kalúz</i>	
REDUCING TRANSMITTED DATA IN NETWORKED EVENT-BASED MPC BY CONSTRAINT SORTING	25
<i>Patrik Simon Berner ; Martin Mönnigmann</i>	
SMART HOUSEHOLD ELECTRICITY USAGE OPTIMIZATION USING MPC AND MILP*	31
<i>Salma Taik ; Bálint Kiss</i>	
COORDINATION OF DISTRIBUTED ENERGY RESOURCES: MODEL PREDICTIVE CONTROL BASED APPROACH	37
<i>Pavel Balda ; Miloš Schlegel ; Ondrej Severa ; Milan Štetina</i>	
A COMPARISON OF TWO APPROACHES TO THE CONTROL OF A SYSTEM WITH DISTRIBUTED PARAMETERS	43
<i>Branislav Rehák ; Petr Augusta</i>	
PID-TYPE CONTROL OF ROBOT MANIPULATORS BY USING GRAVITY AND INERTIAL EFFECTS COMPENSATION	49
<i>Jan Cvejn ; Milan Zapletal</i>	
REHEATING FURNACE MODELING AND TEMPERATURE ESTIMATION BASED ON MODEL ORDER REDUCTION	55
<i>Pavel Skopec ; Tomas Vyhliđal ; Jan Knobloch</i>	
PI PLUS REPETITIVE CONTROL DESIGN: H-INFINITY REGIONS APPROACH	62
<i>Martin Goubey ; Miloš Schlegel</i>	
SYNCHRONIZATION OF SYMMETRIC COMPLEX NETWORKS WITH HETEROGENEOUS TIME DELAYS	68
<i>Branislav Rehák ; Volodymyr Lynnyk</i>	
ASTATISM ANALYSIS OF TIME DELAY CONTROLLERS TOWARDS EFFECTIVE ANTI-WINDUP SCHEMES	74
<i>Jaroslav Bušek ; Pavel Zitek ; Tomáš Vyhliđal</i>	
A LIQUID LEVEL MONITORING SYSTEM FOR A REMOTE RESERVOIR	80
<i>Petr Chalupa ; Martin Vlácil ; Jakub Novák</i>	
CORELATION BETWEEN CONVENTIONAL AND DATA-DRIVEN CONTROL PERFORMANCE ASSESSMENT INDICES FOR HEATING PROCESS	86
<i>Patryk Grelewicz ; Pawel Nowak ; Jacek Czczot ; Michal Fratzak</i>	
TWINGCAT CONTROL OF CNC MACHINE OVER COE	91
<i>Martin Ivan ; Martin Ernek ; Eva Miklovcová</i>	
EXPERIMENTAL MODELLING AND CONTROL OF A TOWER CRANE	97
<i>Romana Čápková ; Alena Kozáková</i>	
ROBUST COMPUTED TORQUE METHOD OF ROBOT TRACKING CONTROL	102
<i>Ján Kardoš</i>	
ROBUST POLE PLACEMENT: D_R-REGIONS FOR DISCRETE-TIME SYSTEMS	108
<i>Mária Hypiúsová ; Danica Rosinová</i>	
UNKNOWN-INPUT OBSERVERS FOR METZLERIAN LINEAR POSITIVE SYSTEMS	114
<i>Dušan Krokavec ; Anna Filasová</i>	
CONTROL OF DISTRIBUTED PARAMETER SYSTEMS AN ENGINEERING APPROACH – TUTORIAL	120
<i>G. Hukó ; C. Belavý ; K. Ondrejko ; L. Bartalský</i>	
ANALYSIS OF MICROCLIMATOLOGY DATA AS A DYNAMIC SYSTEM	126
<i>Jakub Jura ; Pavel Trnka ; Martin Novak</i>	

INTELLIGENT PREDICTIVE MAINTENANCE CONTROL USING AUGMENTED REALITY	131
<i>Michal Kostoláni ; Justín Murín ; Štefan Kozák</i>	
CONSTRUCTION OF THE SMOOTH MORPHING TRAILING EDGE DEMONSTRATOR	136
<i>Filip Svoboda ; Martin Hromčík</i>	
CONTROL SYSTEM FOR DEPOSIT SAFE	140
<i>S. Chamraz ; R. Balogh</i>	
COMPARISON OF RELU AND LINEAR SATURATED ACTIVATION FUNCTIONS IN NEURAL NETWORK FOR UNIVERSAL APPROXIMATION	146
<i>Dominik Stursa ; Petr Dolezel</i>	
ROBUST PI CONTROL DESIGN: DESCRIPTOR SYSTEM APPROACH	152
<i>Jana Paulusová ; Ladislav Körösi ; Vojtech Veselý</i>	
MODEL REFERENCE ADAPTIVE CONTROL OF PNEUMATICS ARTIFICIAL MUSCLE	156
<i>Michal Moucka</i>	
A POTENTIAL USE OF THE BALANCED TUNING METHOD FOR THE CONTROL OF A CLASS OF TIME-DELAY SYSTEMS	161
<i>Libor Pekar ; František Gazdoš</i>	
DATA-DRIVEN IDENTIFICATION OF VEHICLE DYNAMICS USING KOOPMAN OPERATOR	167
<i>Vít Cibulka ; Tomáš Haniš ; Martin Hromčík</i>	
INTRODUCTION OF DRIVING ENVELOPE AND FULL-TIME-FULL-AUTHORITY CONTROL FOR VEHICLE STABILIZATION SYSTEMS	173
<i>Denis Efremov ; Tomáš Haniš ; Martin Hromčík</i>	
VEHICLE LONGITUDINAL DYNAMICS CONTROL BASED ON LQ	179
<i>David Vošahlík ; Tomas Hanis ; Martin Hromčík</i>	
SEMI-PHYSICAL MODEL OF A VEHICLE FOR PLATOONING	185
<i>Igor Béla</i>	
NUMERICAL METHODS FOR DISCRETIZATION OF CONTINUOUS NONLINEAR SYSTEMS USED IN SIL/PIL/HIL SIMULATIONS	191
<i>Stepan Ozana ; Tomas Docekal</i>	
IDENTIFICATION OF HUMANOID BIPED ROBOT DURING WALKING WITH LINEAR REGRESSION MODELS	197
<i>Sherif Sherif ; Veselin Kanchev</i>	
PARAMETER ESTIMATION IN LINEAR DYNAMIC SYSTEMS USING BAYESIAN NETWORKS	203
<i>Maryna Garan ; Sylvain Verron ; Iaroslav Kovalenko ; Osvald Modrlák ; Petr Lepšík</i>	
ENERGY-EFFICIENT SWING-UP AND MPC STABILIZATION OF AN INVERTED PENDULUM	209
<i>Martin Gulan ; Peter Minarcík ; Jakub Kulhánek</i>	
REAL-TIME STABILIZING MPC OF A 2DOF HELICOPTER	215
<i>Martin Gulan ; Peter Minarcík ; Martin Lizůch</i>	
IMPLEMENTATION OF CONTINUOUS-TIME MPC USING B-SPLINE FUNCTIONS	222
<i>Boris Rohal'-Ilkiv ; Martin Gulan ; Peter Minarcík</i>	
MODEL PREDICTIVE CONTROL OF A TUBULAR CHEMICAL REACTOR	228
<i>Anna Vasickaninová ; Monika Bakošová ; Juraj Oravec ; Alajos Mészáros</i>	
RTLS TRACKING OF MATERIAL FLOW IN ORDER TO REVEAL WEAK SPOTS IN PRODUCTION PROCESS	234
<i>Juraj Slovák ; Pavol Vašek ; Matej Šimovec ; Markus Melicher ; Dana Šišmišová</i>	
EDUCATIONAL DEVICE FLEXY² IN THE TEACHING OF EXPERIMENTAL IDENTIFICATION	239
<i>L'Uboš Cirka ; Martin Kalúz ; Diana Dzurková ; Richard Valo</i>	
SOFTWARE FOR THERMOGRAVIMETER	245
<i>František Dušek ; Daniel Honc ; Libor Havlíček ; Jan Merta</i>	
MODEL ADAPTATION WITH QUADRATIC APPROXIMATION IN ITERATIVE REAL-TIME OPTIMIZATION	250
<i>Afaq Ahmad ; Anwesh Reddy Gottu Mukkula ; Sebastian Engell</i>	
MOVING-HORIZON GUARANTEED PARAMETER ESTIMATION: INFLUENCE OF THE MEASUREMENT ERROR	256
<i>Petra Valiauga ; Radoslav Paulen</i>	
COMPARISON OF THREE APPROACHES TO ON-LINE PREDICTION OF A FLUCTUATING PERIODIC DISTURBANCE	262
<i>Pavel Ettlér</i>	
SET-THEORETIC STATE ESTIMATION FOR MULTI-OUTPUT SYSTEMS USING BLOCK AND SEQUENTIAL APPROACHES	268
<i>Carlos E. Valero ; Radoslav Paulen</i>	

A NOTE ON CONVERGENCE OF FINITE DIFFERENCES SCHEMATA FOR GAS NETWORK SIMULATION	274
<i>T-P Azevedo-Perdicoulis ; F. Perestrelo ; R. Almeida</i>	
NUMERICAL SHAPE OPTIMIZATION IN FLUID MECHANICS AT LOW REYNOLDS NUMBER	280
<i>Alexis Courtais ; François Lesage ; Yannick Privat ; Pascal Frey ; Abderrazak M. Latifi</i>	
TRAFFIC SIGNAL CONTROL BASED ON GAME THEORETICAL FRAMEWORK*	286
<i>Jian Guo ; Istvan Harmati</i>	
Author Index	