

2017 6th International Symposium on Advanced Control of Industrial Processes (AdCONIP 2017)

**Taipei, Taiwan
28-31 May 2017**



**IEEE Catalog Number: CFP17ADN-POD
ISBN: 978-1-5090-4398-9**

**Copyright © 2017 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:	CFP17ADN-POD
ISBN (Print-On-Demand):	978-1-5090-4398-9
ISBN (Online):	978-1-5090-4397-2

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

State Feedback Output Regulation for a Boundary Controlled Linear 2x2 Hyperbolic System	1
<i>Xiaodong Xu, Stevan Dubljevic</i>	
Robust Distributed Control for Plantwide Processes Based on Dissipativity in Quadratic Differential Forms.....	7
<i>Chaoxu Zheng, Jie Bao</i>	
Double-Layered Model Predictive Control Strategy with Dynamic Trajectory Calculation	13
<i>Xiao Wang, Shaoyuan Li, Yi Zheng, Yaru Yang</i>	
Optimization of a Pusher Type Reheating Furnace: An Adaptive Model Predictive Control Approach	19
<i>Giacomo Astolfi, Luca Barboni, Francesco Cocchioni, Crescenzo Pepe, Silvia Maria Zanoli</i>	
Multi-Objective Control of a Fed-Batch Bioreactor Using Shrinking Horizon MPC: A Case Study.....	25
<i>Anilkumar Markana, Nitin Padhiyar, Kannan M. Moudgalya</i>	
A Multi-Objective Model Predictive Control for Temperature Control in Extrusion Processes	31
<i>Jingyi Lu, Ridong Zhang, Ke Yao, Furong Gao</i>	
Optimal Allocations of Area Margins and Spares to Accommodate HEN Cleaning Schedules.....	37
<i>Bo-Jyun Liao, Kuang-Ting Yi, Chuei-Tin Chang</i>	
Segregated Targeting for Resource Allocation Networks with Dedicated Sources	43
<i>Sheetal Jain, Santanu Bandyopadhyay</i>	
A Pinch Analysis Approach to Project Selection Problem	49
<i>Pritam Roychaudhuri, Santanu Bandyopadhyay, Dominic Foo, Raymond Tan, Vasiliki Kazantzi</i>	
Active Bypass Design for Optimal Operation of Heat Exchanger Networks.....	55
<i>Siwen Gu, Linlin Liu, Jian Du, Haodong Song, Qingwei Meng</i>	
Optimal Design of Hydrogen Network with Intermediate Header and Minimum Compressor Work	61
<i>Chun Deng, Yuhang Zhou, Meiqian Zhu, Xiao Feng</i>	
Pinch Analysis Approach to Optimal Planning of Biochar-Based Carbon Management Networks	67
<i>Raymond Tan, Santanu Bandyopadhyay, Dominic Foo</i>	
Two-Step Principal Component Analysis for Dynamic Processes	73
<i>Youqing Wang</i>	
Application of Gaussian Processes with Variable Shrinkage Method and Just-In-Time Modeling in the Semiconductor Industry	78
<i>Xiaofei Wu, Lik Teck, Lester Chan, Junghui Chen, Lei Xie</i>	
Valve Stiction Detection Using the Bootstrap Hammerstein System Identification.....	84
<i>Zhengbing Yan, Junghui Chen, Zhang Zheng-Jiang</i>	
A Frequent Pattern Mining Based Shape Defect Diagnosis Method for Cold Rolled Strip Products	90
<i>Xinhang Li, Ningyun Lu, Bin Jiang, Huiping Zhao</i>	
Subspace Decomposition Based Cumulative Quality Analysis for Multiphase Batch Processes	95
<i>Yan Qin, Chunhui Zhao, Furong Gao</i>	
Modified Joint-Y PLS Model for Integrated Use of Data from Similar Plants	101
<i>Naoki Okayama, Sanghong Kim, Manabu Kano, Shinji Hasebe</i>	
A Novel Run-To-Run Optimization Algorithm for Batch Processes Using Localized Partial Least Squares Regression Models.....	107
<i>Dong Hwi Jeong, Chang Jun Lee, Jong Min Lee</i>	
Simultaneous Planning of Production and Utility Systems under Performance Degradation	113
<i>Nur Izyan Zulkafli, Georgios M. Kopanos</i>	
A Dynamic Causal Diagram and Constraint-Based Method for Scheduling in Blast Furnace Gas System of the Steel Industry	119
<i>Feng Jin, Linqing Wang, Jun Zhao, Wei Wang, Ying Liu, Jian Li</i>	
Energy and Economic Performance of Carbon Dioxide Chemical Absorption System with Gas Pressurized Stripping	125
<i>Yen-Chun Liu, Shyang-Ming Lin, Wei-Shiang Hsiu, Yih-Hang Chen, Hsuan Chang</i>	
P-Graph Approach to Human Resource Reallocation in Industrial Plants under Crisis Conditions	131
<i>Kathleen Aviso, Christina Cayamanda, Andres Philip Mayol, Raymond Tan</i>	
Evolutionary Adaptive Dynamic Programming Algorithm for Converter Gas Scheduling of Steel Industry	137
<i>Tianyu Wang, Linqing Wang, Jun Zhao, Wei Wang, Ying Liu</i>	
Adaptive Gain Nonlinear Observer Design Techniques.....	143
<i>Martin Guay</i>	

Simultaneous Estimation of the Number of Principal Components and Kernel Parameter in KPCA	149
<i>Yujia Fu, Huizhong Yang, Hongfeng Tao</i>	
System Identification: New Developments of the Asymptotic Theory and Method	155
<i>Yucui Zhu</i>	
Extension of a Multi-Rate Control Law Independently of Both Reference and Disturbance Responses	161
<i>Takao Sato, Nozomi Ishii, Nozomu Araki, Yasuo Konishi</i>	
Adaptive Output Feedback Control with Predictive Feedforward Input Based on Extended Output Estimator	166
<i>Seiya Fujii, Ikuro Mizumoto</i>	
Verification of the Relationship between Desired Angle Ratio and Control Performance in the Links of a Gymnastic Based Controller for an Underactuated Robot	172
<i>Masaki Akiyama, Tomohiro Henmi, Toru Yamamoto</i>	
A Bayesian Learning and Data Mining Approach to Reaction System Identification: Application to Biomass Conversion	178
<i>Dereje Tefea, Arno De Klerk, Vinay Prasad</i>	
Self-Repairing Control for Plants with High Relative Degrees	184
<i>Masanori Takahashi</i>	
Design of a Discrete-Time ASPR Based Adaptive Output Feedback Control System with a Feedforward Input	190
<i>Zhe Guan, Shin Wakitani, Ikuro Mizumoto, Toru Yamamoto</i>	
A Weighted Gaussian Process Regression for Multivariate Modelling	195
<i>Xiaodan Hong, Lihong Ren, Lei Chen, Fan Guo, Yongsheng Ding, Biao Huang</i>	
Deep Reinforcement Learning Approaches for Process Control	201
<i>Steven Spielberg Pon Kumar, Bhushan Gopaluni, Philip Loewen</i>	
Advances in Big Data Analytics at the Dow Chemical Company	207
<i>Leo Chiang, Bo Lu, Ivan Castillo</i>	
Proposal of Two Classifiers of Offshore Naturally Flowing Wells Events Using K-Nearest Neighbors, Sliding Windows and Time Multiscale	209
<i>Ricardo Emanuel Vaz Vargas Vargas, Celso Jose Munaro, Patrick Marques Ciarelli, Jean Carlos Dias De Araujo</i>	
Research and Application of KICA AROMF Based Fault Diagnosis	215
<i>Qunxiong Zhu, Qian-Qian Meng, Yuan Xu, Yan-Lin He</i>	
Challenges in the Discrete-Time Identification of LTI Multiscale Systems: A Critical Overview	221
<i>Vivek Shankar Pinnamaraju, Arun K. Tangirala</i>	
Identification of LTV Systems with Cascade Control Loops Using Basis Function Approach	227
<i>Shaowu Ku, Junghui Chen, Lik Teck, Lester Chan</i>	
Parameter Identification Method for Process Control Systems Based on the Newton Iteration	233
<i>Ling Xu, Feng Ding, Yanjun Liu, Junhong Li, Jing Chen</i>	
Identification of FIR Models Using Basis Models of First-Order Plus Time Delays	239
<i>Wenyi Shen, Xinqing Gao, Fan Yang, Yongheng Jiang, Hao Ye, Dexian Huang</i>	
Modeling of Hemoglobin Response to Erythropoietin Therapy through Constrained Optimization	245
<i>Jia Ren, Jayson McAllister, Li Zukui, Jinfeng Liu, Ulrich Simonsmeier</i>	
Parameter Identification for Breakage Distribution Function of Bauxite Based on State Transition Algorithm	251
<i>Yalin Wang, Kai Peng, Xiaofeng Yuan, Ling Li, Guanyu Chen</i>	
Using [EMIM][OAC] As Entrainer for Isopropyl Alcohol Dehydration Via Extractive Distillation	257
<i>Hung-Hsing Chen, Meng-Kai Chen, I-Lung Chien</i>	
Performance of Reactive Distillation Columns with Multiple Reactive Sections for the Disproportionation of Trichlorosilane	263
<i>Xinxiang Zang, Haisheng Chen, Kejin Huang</i>	
Design and Control of Diphenyl Carbonate Reactive Distillation Using a Thermally Coupled Configuration	269
<i>Hsiang-Ning Chang, Hao-Yeh Lee</i>	
Simulation and Optimization of Structured Packing Replacement in Absorption Column of Natural Gas Dehydration Unit Using Triethylene Glycol (TEG)	275
<i>Sony Ardian Affandy, Renanto Handogo, Juwari Purwo Sutikno, I-Lung Chien</i>	
Dynamics and Control of Totally Reboiled Reactive Distillation Columns	282
<i>Tengfei Wang, Haisheng Chen, Kejin Huang</i>	
Design and Control of Diphenyl Carbonate Reactive Distillation Processes Using Arrangements with Heat-Integrated Stages	288
<i>J. Rafael Alcantara-Avila, Masataka Terasaki, Hao-Yeh Lee, Jun-Lin Chen, Julian Cabrera-Ruiz, Ken-Ichiro Sotowa, Toshihide Horikawa</i>	

Robust Preliminary-Summation-Based Principal Component Analysis for Non-Gaussian Processes with Outliers	294
<i>Youqing Wang</i>	
Online Flooding Prognosis in Packed Columns by Monitoring Parameter Change in EGARCH Model	300
<i>Yi Liu, Bo-Fan Hseuh, Zengliang Gao, Yuan Yao</i>	
Active Learning Dynamic Soft Sensor with Forward-Update Scheme	306
<i>Qing-Yang Wu, Lik Teck, Lester Chan, Junghui Chen</i>	
Tensor-Based Ultrasonic Signal Processing for Defect Detection in Fiber Reinforced Polymer (FRP) Structures	312
<i>Renchun You, Yuan Yao, Jia Shi</i>	
Parameter Optimization of Simple Adaptive Control Via Differential Evolution	318
<i>Taro Takagi, Minoru Ito, Ikuro Mizumoto</i>	
Empirical Trajectories for Batch Crystallization Control with Constraints	324
<i>Hsiang-Feng Hsieh, Jeffrey Daniel Ward</i>	
R2R Controller Design Using T-S Fuzzy Model and Extended State Observer	330
<i>Haiyan Wang, Fei Tan, Biqi Sheng, Tianhong Pan, Haijun Fu</i>	
A Power Plant Coordinated Control System Using MPC	336
<i>Jia Luo, Yucai Zhu, Shihe Chen, Pengfei Jiang, Le Wu, Yuwen Xiao</i>	
Control of Two Batch Crystallization Processes with Apparent Growth-Rate Dispersion	342
<i>William Chen, Hung-Chih Cho, Jeffrey Daniel Ward</i>	
A Novel Single-Input Two-Output Strategy for Split Range Control	348
<i>Sultan Fatani, Rohit Patwardhan, Miguel Lopez Andreu</i>	
Plant-Wide Design and Control of C5 Separation Processes	354
<i>Hsiao-Ching Hsu, San-Jang Wang, John Di-Yi Ou, David Shan Hill Wong</i>	
Software Integration for Online Dynamic Simulation Applications	360
<i>Matthew Mitchell, Isuru Sampath Bandara Abeykoon Udugama, Jonathan Currie, Wei Yu</i>	
Design of a Data-Oriented Cascade Control System	365
<i>Takuya Kinoshita, Toru Yamamoto, Lakshminarayanan Samavedham</i>	
OS-λ_1-ELM: Online Sequential λ_1-regularized-ELM based on ADMM	371
<i>Dazi Li, Zhiyin Liu</i>	
Process Design of Aqueous Ammonia-Based Post-Combustion CO₂ Capture	377
<i>Jialin Liu, Ding-Sou Chen</i>	
Design and Control of a Plant-Wide Process for the Production of Epichlorohydrin	383
<i>Chien-Chih Huang, San-Jang Wang, David Shan Hill Wong</i>	
An Automated Approach for Supertargeting of Heating Medium System	389
<i>Diban Pitchaimuthu, Dominic Foo</i>	
Regional Energy Planning Using Mathematical Optimisation	395
<i>Wan-Syuan Syu, Jui-Yuan Lee</i>	
Contribution of Production Support System to Reinforce Process Resilience in the Chemical Industry	400
<i>Hajime Eguchi, Davaadorj Nyambayar, Ichiro Koshijima</i>	
Design of a Data-Oriented Evolutionary Controller for a Nonlinear System	406
<i>Qiu hao Fu, Kazushige Koiwai, Toru Yamamoto</i>	
Model Predictive Control and Optimization of Vacuum Pressure Swing Adsorption for Carbon Dioxide Capture	412
<i>Wenli Du, Khalil Abdulghani Mutahar Alkebsi</i>	
Transient Response Analysis of High Pressure Steam Distribution Networks in a Refinery	418
<i>Chiao-Ying Chang, Shih-Han Wang, Cheng-Liang Chen, Yu-Cheng Huang</i>	
Iterative Learning State Estimation for Batch Process	424
<i>Zhonggai Zhao, Pengcheng Qi, Fei Liu</i>	
A Simple PID Controller for a Magnetic Bearing with Four Poles and Interconnected Magnetic Flux	430
<i>Christian Tshizubu, Jose Andres Santisteban</i>	
Dynamic Optimization of Semi-Batch Acetone;$\frac{1}{2}$Butanol;$\frac{1}{2}$Ethanol Fermentation with In-Situ Pervaporation Membrane Separations	436
<i>Ta-Chen Lin, Ya-Hsun Lee</i>	
A Hybrid Modeling Strategy for Synthesizing Diagnostic Tests in Sequential Material and Energy-Transfer Operations	442
<i>Shih-Ting Fong, Chung Jung Wang, Chuei-Tin Chang</i>	
Agent Based Fault Detection Using Negative Selection Algorithm for Chemical Processes	448
<i>Naoki Kimura, Yuya Takeda, Taichi Hasegawa, Yoshifumi Tsuge</i>	
Model-Based Monitoring of Fouling in a Heat Exchanger	453
<i>Yoshiyuki Yamashita</i>	

Review on Chemical Process Fault Detection and Diagnosis	457
<i>Liang Ming, Jinsong Zhao</i>	
Fault-Tolerant Design of Membrane Modules for Organic Mixture Separation	463
<i>Vincentius Surya Kurnia Adi, Rosalia Laxmidewi, Chuei-Tin Chang</i>	
Retrofitting Industrial Heat Exchanger Network Based on Pinch Analysis	469
<i>Bao-Hong Li, Chuei-Tin Chang</i>	
Optimum Water Network Design for Multipurpose Batch Plants with an Electrodialysis Central Regeneration Unit	475
<i>Nsunda Christie Bazolana, Thokozani Majazi</i>	
Use of Confidence Region in the Optimal Design of a Separation Process in the Presence of Uncertainties	481
<i>Shueh-Hen Cheng, Chi-Hao Lo, Ta-Chen Lin</i>	
A Systematic Approach to Modeling Organic Rankine Cycle Systems for Global Optimization	487
<i>Vathna Am, Jonathan Currie, David I. Wilson</i>	
Process Design and Simulation of Industrial Scale Biofuel Production Via Pyrolysis of Saccharina Japonica	493
<i>Boris Brigljevic, J. Jay Liu</i>	
Synthesis of Flexible Multi-Period Heat Exchanger Networks for a Changing Utility Cost Scenario	499
<i>Adeniyi Jide Isafiade</i>	
Data-Based Design of Centralized PID Controllers for Decoupling Control of Multivariable Processes	505
<i>Jyh-Cheng Jeng, Yuan-Siang Jian, Ming-Wei Lee</i>	
Convergence Property for Iterative Data-Driven PID Gain Tuning Based on Generalized Minimum Variance Regulatory Control	511
<i>Ryoko Yokoyama, Shiro Masuda</i>	
Fictitious Reference Iterative Tuning of Cascade Control Systems for Non-Minimum Phase Systems	517
<i>Huy Nguyen Quang, Osamu Kaneko</i>	
Design of Centralized PID Controllers for TITO Processes	523
<i>Byeong Eon Park, Su Whan Sung, In-Beum Lee</i>	
Design of a Performance-Driven PID Controller for a Nonlinear System	529
<i>Yuntao Liao, Takuya Kinoshita, Kazushige Koiwai, Toru Yamamoto</i>	
PID Control Loop Performance Assessment and Diagnosis Based on DEA-Related MCDA	535
<i>Zun Wang, Yongming Han, Zhiqiang Geng, Qunxiong Zhu, Yuan Xu, Yan-Lin He</i>	
Beyond the Theory - How Can Academia Contribute to the Advanced Process Control of Industrial Processes?	541
<i>M. Tajammal Munir, Isuru Sampath Bandara Abeykoon Udugama, Ira Boiarkina, Wei Yu, Brent Young</i>	
Distributed Fault Detection and Isolation of Nonlinear Systems Using Output Feedback	547
<i>Xunyu Yan, Jinfeng Liu</i>	
Design of a Performance-Driven PID Controller	553
<i>Toru Yamamoto, Takuya Kinoshita, Yoshihiro Ohnishi, Sirish L Shah</i>	
A Modified Recursive Locally Weighted NIR Modeling for Fermentation Process	559
<i>Lingyi Chen, Zhonggai Zhao, Fei Liu</i>	
On Initialization of the Kalman Filter	565
<i>Shunyi Zhao, Biao Huang</i>	
Improved Compound Controller for Active Power Filter	571
<i>Yifan Wang, Hong Zheng, Ruoyin Wang, Zhu Wen</i>	
Output-Related Feature Representation for Soft Sensing Based on Supervised Locality Preserving Projections	577
<i>Xiaofeng Yuan, Yalin Wang, Chunhua Yang, Weihua Gui, Qingchao Jiang</i>	
A Novel Algorithm for Targeted Metabolite Profiling Using NMR Spectrum	583
<i>Frost Xu, Madhav Mantri, Li Zukui</i>	
Multi-Objective Complexity Reduction for Set-Based Fault Diagnosis	589
<i>Anton Savchenko, Petar Andonov, Philipp Rumschinski, Rolf Findeisen</i>	
Statistical Online Model Quality Monitoring for Linear Closed-Loop Control System	595
<i>Dan Ling, Ying Zheng, Xiaoyu Yang, Yan Wang</i>	
Application of the Improved Multivariate Empirical Mode Decomposition to Plant-Wide Oscillations Characterization	601
<i>Xun Lang, Dan Zhong, Lei Xie, Junhui Chen, Hongye Su</i>	
Handling Class Imbalance and Multiple Inspection Objectives in Design of Industrial Inspection System	606
<i>Ali Yousefian, J. Jay Liu</i>	
Survey on Advanced Alarm Strategies Based on Multivariate Analysis	612
<i>Fan Yang, Cen Guo</i>	

A Real-Time Streamline-Based Obstacle Avoidance System for Curvature-Constrained Nonholonomic Mobile Robots.....	618
<i>Kuo Pei-Li, Wang Chung-Hsun, Han-Jung Chou, Jing-Sin Liu</i>	
Efficient Operating Condition of Side Stream Simulated Moving Bed Chromatography for Ternary Fluid Mixtures.....	624
<i>Tae Hoon Oh, Se-Kyu Oh, Jong Min Lee</i>	
Graph-Theoretic Control Structure Synthesis for Optimal Operation of Heat Exchanger Networks.....	630
<i>Lixia Kang, Yongzhong Liu</i>	
Evaluation of Gas-Liquid Contact Area and Liquid Holdup of Random Packing Using CFD Simulation	636
<i>Jia-Lin Kang, Wei-Fu Chen, David Shan Hill Wong, Shi-Shang Jang</i>	
Modeling and Optimization of a Fast Fluidized Bed Reactor for Carbonation Reactions	642
<i>Jhao-Rong Chen, Wei Wu</i>	
Author Index	