ADCHEM 2009

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International Symposium on Advanced Control of Chemical Processes

July 12-15, 2009
Istanbul, Turkey

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Morning

Time	Sunday July 12	Monday July 13	Tuesday July 14	Wednesday July 15	Time
08:30		Opening		Plenary III **Manabu Kano**	08:30
09:00		Plenary I **Mario Campos**	Plenary II **Stephen P. Boyd**		
				Coffee Break	09:30
				Keynote 3.1 **M. Darby** Keynote 3.2 **D. Dochain**	09:50
10:00		Coffee Break			
				Break	10:20
10:20		Keynote 1.1 **J. Lee** Keynote 1.2 **T. Kourti**	Keynote 2.1 **V. Hessel** Keynote 2.2 **M. Guay**	Oral presentations Session C.1 **Optimization and Optimal Control** Session C.2 **Controller Tuning** Session C.3 **Estimation**	10:30
10:50		Break			
11:00		Oral presentations Session A.1 **Distributed Control** Session A.2 **Biological Systems** Session A.3 **Analysis and Control of Crystallization Processes**	Oral presentations Session B.1 **Monitoring and Hybrid Control of Industrial Processing Systems** Session B.2 **Nonlinear and Adaptive Control** Session B.3 **Modeling and Simulation**		
				Lunch Break	12:10
12:40		Lunch Break		Keynote 3.3 **L. Samavedham** Keynote 3.4 **J. J. Downs & S. Skogestad**	13:15
				Coffee Break	13:45

Afternoon

Time	Sunday July 12	Monday July 13	Tuesday July 14	Wednesday July 15	Time
14:00		Keynote 1.3 **J.-U. Repke** Keynote 1.4 **G. Févotte**	Keynote 2.3 **B. Foss** Keynote 2.4 **C. Scali**	**Oral presentations** Session C.4 **Plantwide Control** Session C.5 **Emerging Methods and Technologies** Session C.6 **Process Monitoring**	**14:00**
14:30		Break			
14:40		**Oral presentations** Session A.4 (part 1) **Model-predictive Control Algorithms** Session A.5 (part 1) **Applications** Session A.6 (part 1) **Fault Detection and Diagnosis**	**Oral presentations** Session B.4 (part 1) **Control and Estimation of Distillation Systems** Session B.5 (part 1) **Advances in Identification** Session B.6 (part 1) **Performance Assessment in Closed-loop Systems**		
15:40		Coffee Break			
16:00		**Oral presentations** Session A.4 (part 2) Session A.5 (part 2) Session A.6 (part 2)	**Oral presentations** Session B.4 (part 2) Session B.5 (part 2) Session B.6 (part 2)	**Closing Ceremony** incl. presentation of the BTS Young Author Award	**16:00**
				End of Conference	**16:30**
17:00		**Poster presentations** Session PA.1 **Process Control and Optimization** Session PA.2 **Advances in Modeling, Estimation, and Identification**	**Poster presentations** Session PB.1 **Process Control Applications** Session PB.2 **Process Monitoring and Diagnosis**		
18:40		Break			
19:30	**Welcome Reception**	**Dinner at Fish Restaurant**	**Banquet Boat Tour**		

Plenary Lectures

Plenary I Monday, July 13, 2009 09:00 – 10:00 Sevgi Gönül Auditorium **Chair: J. Trierweiler**	**Challenges and Problems with Advanced Control and Optimization Technologies [245]** **Mario Campos**, Petrobras, Brazil with H. Teixeira, F. Liporace, and M. Gomes **Abstract:** Oil & Gas companies continuously try to create and increase business value of their installations (platforms, refineries, etc). Particularly the increasing energy consumption on a worldwide basis and, as a result, the substantial increase in prices volatility is a major drive for better advanced control and optimization technologies. Advanced control and optimization system can play an important role to improve the profitability and stability of industrial plants. This paper discusses the problems and challenges of advanced control and optimization in petroleum industries nowadays. It emphasizes the importance of control performance assessment technology to maintain a good regulatory control and the difficulties in using these technologies. It also shows the importance of malfunction detection and diagnosis advisory system for critical equipment in order to increase the operational reliability. Model predictive control (MPC) has become a standard multivariable control solution in the continuous process industries, but there are still many open issues related to accelerate a new implementation and maintain the controller with a good performance along the years. Real time optimization tools also impose new challenges for Oil & Gas industries application, which are discussed in this paper.
Plenary II Tuesday, July 14, 2009 09:00 – 10:00 Sevgi Gönül Auditorium **Chair: S. Engell**	**Real-time Embedded Convex Optimization [246]** **Stephen P. Boyd**, Stanford University, USA with J. Mattingley and Y. Wang **Abstract:** This talk concerns the use of convex optimization, embedded as part of a larger system that executes automatically with newly arriving data or changing conditions, in areas such as automatic control, signal processing, real-time estimation, real-time resource allocation and decision making, and fast automated trading. Such systems are already in use in applications such as model predictive control or supply chain optimization, with sample times measured in minutes (or longer); our focus is on systems with much faster dynamics, with execution times measured in milliseconds or microseconds for small and medium size problems. We describe a preliminary implementation of an automatic code generation system, which scans a description of the problem family and performs much of the analysis and optimization of the algorithm, such as choosing variable orderings used with sparse factorizations, at code generation time; compiling the generated source code yields an extremely efficient custom solver for the problem family.
Plenary III Wednesday, July 15, 2009 08:30 – 09:30 Sevgi Gönül Auditorium **Chair: Y. Arkun**	**The State of the Art in Advanced Chemical Process Control in Japan [240]** **Manabu Kano**, Kyoto University, Japan with M. Ogawa **Abstract:** In this age of globalization, the realization of production innovation and highly stable operation is the chief objective of the process industry in Japan. Obviously, modern advanced control plays an important role to achieve this target; but it is emphasized here that a key to success is the maximum utilization of PID control and conventional advanced control. This paper surveys how the three central pillars of process control -- PID control, conventional advanced control, and linear/nonlinear model predictive control --have been used and how they have contributed toward increasing productivity. In addition to introducing eminently practical methods, emerging methods, and their applications, the authors point out challenging problems. In Japan, industry and academia are working in close cooperation to share their important problems and develop new

technologies for solving them. Several methods introduced in this paper are results of such industry-academia collaboration among engineers and researchers in various companies and universities. Furthermore, soft-sensor or virtual sensor design is treated with emphasis on its maintenance, because soft-sensors must cope with changes in process characteristics for their continuous utilization. Maintenance is a key issue not only for soft-sensors but also for controllers. Finally, we will expand our scope and briefly introduce recent activities in tracking simulation and alarm management. A part of the results of our recent questionnaire survey of process control are also introduced; the results are extremely helpful in clarifying the state of the art in process control in Japan.

Keynote Lectures

Monday, July 13, 2009	
Keynote 1.1 10:20 – 10:50 Sevgi Gönül Auditorium	**Approximate Dynamic Programming Approach to Process Control [243]** **Jay Lee**, Georgia Institute of Technology, USA Chair: W. Marquardt
Keynote 1.2 10:20 – 10:50 Gülgen Çağlar Auditorium	**Quality by Design in the Pharmaceutical Industry: Multivariate Process Modelling, Monitoring and Control [188]** **Theodora Kourti**, GlaxoSmithKline and McMaster University, Canada Chair: C. Georgakis
Keynote 1.3 14:00 – 14:30 Sevgi Gönül Auditorium	**Plantwide Optimizing Control for the Bio-ethanol Process [114]** **Jens-Uwe Repke**, TU Berlin, Germany with S. Ochoa and G. Wozny Chair: D. Odloak
Keynote 1.4 14:00 – 14:30 Gülgen Çağlar Auditorium	**A new Approach for the Modelling of Crystallization Processes in Impure Media using Population Balance Equations [96]** **Gilles Févotte**, Université Lyon 1 & EMSE, France with F. Févotte Chair: A. Vande Wouwer
Tuesday, July 14, 2009	
Keynote 2.1 10:20 – 10:50 Sevgi Gönül Auditorium	**Micro Process Engineering for Fine Chemistry and Fuel Processing - From Lab to Pilot/Production and First Issues on Dynamic Operation [241]** **Volker Hessel**, IMM Mainz, Germany, and TU Eindhoven, Netherlands Chair: S. Hasebe
Keynote 2.2 10:20 – 10:50 Gülgen Çağlar Auditorium	**Integration of Real-time Optimization and Model Predictive Control [160]** **Martin Guay**, Queen's University, Canada with V. Adetola Chair: R. Findeisen
Keynote 2.3 14:00 – 14:30 Sevgi Gönül Auditorium	**Dantzig-Wolfe Decomposition for Real-time Optimization - applied to the Troll West Oil Rim [88]** **Bjarne Foss**, Norwegian University of Science and Technology, Norway with V. Gunnerud, B. Nygreen, R. Vestbø, and N.C. Walberg Chair: C. de Prada
Keynote 2.4 14:00 – 14:30 Gülgen Çağlar Auditorium	**Implementation and Validation of a Closed Loop Performance Monitoring System [47]** **Claudio Scali**, University of Pisa, Italy with M. Farnesi, R. Loffredo, and D. Bombardieri Chair: S. Shah

Wednesday, July 15, 2009	
Keynote 3.1 09:50 – 10:20 Sevgi Gönül Auditorium	**MPC: Current Practice and Challenges [239]** **Mark Darby**, CMiD Solutions, USA with M. Harmse and M. Nikolaou Chair: T. Backx
Keynote 3.2 09:50 – 10:20 Gülgen Çağlar Auditorium	**Power-Shaping Control of an Exothermic Continuous Stirred Tank Reactor (CSTR) [35]** **Denis Dochain**, Université Catholique de Louvain, Belgium with A. Favache Chair: J. Alvarez
Keynote 3.3 13:15 – 13:45 Sevgi Gönül Auditorium	**Treatment Planning of Cancer Dendritic Cell Therapy using Multi-objective Optimization [109]** **Lakshminarayanan Samavedham**, National University of Singapore with L.K. Kanchi Chair: F. Doyle
Keynote 3.4 13:15 – 13:45 Gülgen Çağlar Auditorium	**An Industrial and Academic Perspective on Plantwide Control [242]** **James J. Downs**, Eastman Chemical Company, USA **Sigurd Skogestad**, Norwegian University of Science and Technology, Norway Chair: G. Dünnebier

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8:30	Opening (Sevgi Gönül Auditorium)		
9:00	**Plenary Lecture I (Sevgi Gönül Auditorium)** **Mario Campos** Chair: J. Trierweiler		
10:00	Coffee Break		
10:20	**Keynote Lecture 1.1 (Sevgi Gönül Auditorium)** **Jay Lee** Chair: W. Marquardt	**Keynote Lecture 1.2 (Gülgen Çağlar Auditorium)** **Theodora Kourti** Chair: C. Georgakis	
10:50	Break		
11:00	**Session A.1 (Nesteren Bayramoğlu Auditorium)** **Distributed Control** Chairs: D. Bonvin and G. Pannocchia	**Session A.2 (Gülgen Çağlar Auditorium)** **Biological Systems** Chairs: D. Dochain and R. King	**Session A.3 (Fuat Bayramoğlu Auditorium)** **Analysis and Control of Crystallization Processes** Chairs: Z. Nagy and M. Tade
11:00	**Industrial Implementation of a Coordinator MPC for Maximizing Throughput at a Large-Scale Gas Plant [23]** E.M. Aske, S. Strand S. Skogestad StatoilHydro R&D Norwegian Univ. of Science and Technology	**Analysis, Control, and Operational Optimization of a Zymomonas mobilis Reactor with Equilibrium Multiplicity [115]** J.O. Trierweiler, F.C. Diehl Federal University of Rio Grande do Sul	**A Stochastic Approach for Anti-Solvent Addition Policy in Crystallization Operations: An Application to a Bench-Scale Fed-Batch Crystallizer [21]** O. Galan, J. Romagnoli M. Grosso, R. Baratti Louisiana State University University of Cagliari
11:20	**Coordination of Distributed Model Predictive Controllers for Constrained Dynamic Processes [52]** N.I. Marcos, J.F. Forbes M. Guay University of Alberta Queen´s University	**Adaptive Extremum-seeking Control of Fed-batch Cultures of Micro-organisms exhibiting Overflow Metabolism [38]** L. Dewasme, A. Vande Wouwer B. Srinivasan, M. Perrier Faculté Polyt. de Mons Ecole Polyt. de Montréal	**Model Based Robust Batch-to-Batch Control of Particle Size and Shape in Pharmaceutical Crystallisation [229]** Z. Nagy Loughborough University
11:40	**Integrating Control and Scheduling of Distributed Energy Resources Over Networks [182]** Y. Sun, S. Ghantasala, N. El-Farra UC Davis	**Probing Protein Folding Dynamics Using Multivariate Statistical Techniques [14]** A. Palazoglu Y. Arkun, B. Erman, A. Gursoy UC Davis Koc University	**Modeling and Control System Design of a Crystallizer Train for Para-xylene Production [73]** S. Amano, G. Emoto H. Seki Mitsubishi Corp. Tokyo Institute of Technology
12:00	**Distributed Model Predictive Control of Nonlinear Process Systems Subject to Asynchronous Measurements [111]** J. Liu, P. Christofides D. Muñoz de la Peña UCLA University of Seville	**Applied Advanced Process Analytics in Biopharmaceutical Manufacturing: Challenges and Prospects in Real-time Monitoring and Control [159]** C. Undey, S. Ertunc, T. Mistretta, M. Pathak Amgen, Inc.	**Evaluation of the Effect of the Solubility Model on Antisolvent Crystallization Optimization [193]** D. Widenski, J. Romagnoli A. Abbas Louisiana State University University of Sydney
12:20	**Predictive Control of Nonlinear Chemical Processes under Asynchronous Measurements and Controls [173]** P. Varutti, R. Findeisen University of Magdeburg	**Cascade Hybrid Control for Anaerobic Digestion Systems [79]** J.P. García-Sandoval University of Guadalajara	**Numerical Studies of Wavelet-based Method as an Alternative Solution for Population Balance Problems in a Batch Crystalliser [72]** J. Utomo, T. Zhang, N. Balliu, M.O. Tade Curtin University of Technology
12:40	Lunch Break		

Notes

14:00	**Keynote Lecture 1.3 (Sevgi Gönül Auditorium)** **Jens-Uwe Repke** Chair: D. Odloak		**Keynote Lecture 1.4 (Gülgen Çağlar Auditorium)** **Gilles Févotte** Chair: A. Vande Wouwer
14:30	**Break**		
14:40	**Session A.4 (Nesteren Bayramoğlu Auditorium)** **Model-predictive Control Algorithms** Chairs: R. Berber and K. Kouramas	**Session A.5 (Gülgen Çağlar Auditorium)** **Applications** Chairs: J.P. Corriou and S. Palanki	**Session A.6 (Fuat Bayramoğlu Auditorium)** **Fault Detection and Diagnosis** Chairs: R. Baratti and G. Roux
14:40	**Economic Dynamic Real-Time Optimization and Nonlinear Model-Predictive Control on Infinite Horizons [124]** L. Wuerth, W. Marquardt J.B. Rawlings RWTH Aachen University of Wisconsin	**Energy Consumption Optimization of RO Membrane Desalination Subject to Feed Salinity Fluctuation [116]** A. Zhu, P. Christofides, Y. Cohen UCLA	**Fault Detection in Process Systems using Hidden Markov Disturbance Models [106]** W.C. Wong, J. Lee Georgia Institute of Technology
15:00	**Soft Constraints for Robust MPC of Uncertain Systems [54]** G. Prasath J.B. Jørgensen FLSmidth Technical University of Denmark	**A Novel Image Based Algorithm for Interface Level Detection in a Separation Cell [231]** P. Jampana, S.L. Shah University of Alberta	**Root Cause Diagnosis of Plantwide Disturbance using Harmonic Analysis [89]** M. Choudhury, S. Barua, M.A. Karim, N. Sanzida Bangladesh University of Eng. and Technology
15:20	**Dynamic Operability for the Calculation of Transient Output Constraints for Non-Square Linear Model Predictive Controllers [130]** F. Lima, C. Georgakis Tufts University	**Model-Based Dosing Control of a Pellet Softening Reactor [37]** K. van Schagen R. Babuska, L. Rietveld A. Veersma DHV BV TU Delft Waternet	**Systematic Development of Automata Generated Languages for Fault Diagnosis in Continuous Chemical Processes [2]** C.-T. Chang, J.Y. Chen National Cheng Kung University
15:40	**Coffee Break**		
16:00	**Computation of the Infinite Horizon Continuous Time Constrained Linear Quadratic Regulator [59]** G. Pannocchia J.B. Rawlings D. Mayne Univ. of Pisa Univ. of Wisconsin Imperial College W. Marquardt, RWTH Aachen	**Repetitive Control and Online Optimization of Catofin Propane Process [92]** W. Won, K.S. Lee S. Lee, C. Jung Sogang University Samsung Engineering Co.	**Sensor Location for Effective Fault Diagnosis in Micro Chemical Processes [232]** O. Tonomura, S. Nagahara, J. Kano, M. Kano, S. Hasebe Kyoto University
16:20	**Explicit Robust Model Predictive Control [177]** E. Pistikopoulos, K. Kouramas N. Faisca C. Panos Process Systems Imperial College Enterprise Ltd.	**Model-based Control Design of a Diesel Oxidation Catalyst [172]** O. Lepreux, Y. Creff N. Petit IFP France MINES ParisTech	**Data-driven Control Loop Diagnosis: Dealing with Temporal Correlation in Bayesian Methods [195]** F. Qi, B. Huang University of Alberta
16:40	**Robust Adaptive MPC for Systems with Exogeneous Disturbances [161]** V. Adetola, M. Guay Queen's University	**Controller Design in a Fuel-Cell Powered Automobile [94]** S. Palanki J. Telotte University of South Alabama Florida State University	**Data-based Fault Detection and Isolation Using Output Feedback Control [107]** B. Ohran, J. Liu, D. Muñoz de P. Christofides, J. Davis la Peña UCLA University of Seville
17:00	**Poster Sessions & Coffee Break (Sevgi Gönül Auditorium Symposium Area)**		

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Poster Session PA.1 (17:00, Sevgi Gönül Auditorium Symposium Area) **Process Control and Optimization**	Poster Session PA.2 (17:00, Sevgi Gönül Auditorium Symposium Area) **Advances in Modeling, Estimation, and Identification**
Nonlinear Model Predictive Control Using Multiple Shooting Combined with Collocation on Finite Elements [22] **J. Tamimi, P. Li**, TU Ilmenau	**Multirefinery and Petrochemical Networks Design and Integration [20]** **K. Alqahtani** **A. Elkamel** **E. Alper** Saudi Aramco University of Waterloo Hacettepe University
Robust Control of Yeast Fed-Batch Cultures for Productivity Enhancement [24] **D. Coutinho, L. Dewasme, A. Vande Wouwer** Faculté Polytechnique de Mons	**Nonlinear State Estimation of Differential Algebraic System [31]** **R.K. Mandela** **S. Narasimhan** **R. Rengaswamy** Clarkson University IIT Madras Texas Tech University
Human Operator Based Fuzzy Intuitive Controllers Tuned with Genetic Algorithms [215] **F. Barbosa, A. Quelhas**, Petrobras **M. Tham, J. Zhang**, Newcastle University	**River Water Quality Model Verification through a GIS-based Software [48]** **M.K. Yetik** **M. Yuceer** **R. Berber** **E. Karadurmus** Turkish Statistical Institute Inonu University Ankara University Hitit University
Considerations on Set-Point Weight choice for 2-DoF PID Controllers [45] **V.M. Alfaro** **R. Vilanova, O. Arrieta** University of Costa Rica Autonomous University of Barcelona	**Unscented Kalman Filter State and Parameter Estimation in a Photobioreactor for Microalgae Production [83]** **G. Marafioti, M. Hovd** **S. Tebbani, D. Beauvois G. Becerra, A. Isambert** Norwegian University of Science and Technology SUPELEC LGPM, Ecole Centrale Paris
A Nonlinear Control Strategy for a Bidirectional Flow Process [50] **P. Zúñiga Salas, H. Ramírez Estay, D. Sbarbaro Hoffer**, University of Concepción	**Dynamic Model of NOx Emission for a Fluidized Bed Sludge Combustor [91]** **S. Li, C. Cadet, P.-X. Thivel, F. Delpech**, UJF Grenoble
Characteristics-based MPC of a Fixed Bed Reactor with Catalyst Deactivation [62] **L. Mohammadi, I. Aksikas, J.F. Forbes** University of Alberta	**Comparison of Different Modeling Concepts for Drying Process of Baker's Yeast [93]** **U. Yüzgeç**, Kocaeli University **M. Türker**, Pakmaya
Hierarchical Economic Optimization of Oil Production from Petroleum Reservoirs [158] **G.M. van Essen, P.M.J. Van den Hof** **J.D. Jansen** TU Delft Shell Int. E&P / TU Delft	**Dynamic Modeling and Control Issues on a Methanol Reforming Unit for Hydrogen Production and Use in a PEM Fuel Cell [122]** **D. Ipsakis, S. Voutetakis, P. Seferlis**, Centre for Research and Technology Hellas (CERTH) **S. Papadopoulou**, Alexander Technological Educational Institute of Thessaloniki
Expected Cost Optimization using Asymmetric Probability Density Functions [125] **B. Pigeon, M. Perrier, B. Srinivasan** Ecole Polytechnique de Montréal	**Dynamic Modelling of a Three-phase Catalytic Slurry Intensified Chemical Reactor [140]** **S. Bahroun, C. Jallut, C. Valentin**, Université Lyon 1 **F. De Panthou**, AET Group
Application of Near-infrared Spectroscopy in Batch Process Control [227] **H. Lin, O. Marjanovic, B. Lennox** **A. Shamekh** University of Manchester University of Garyounis	**Identification of an Ill-Conditioned Distillation Column Process using Rotated Signals as Input [191]** **M.S. Sadabadi, J. Poshtan**, Iran University of Science and Technology
Profitability and Re-usability: An Example of a Modular Model for Online Optimization [136] **M. Bauer, M. Chioua, J. Schilling, G. Sand, I, Harjunkoski**, ABB Corporate Research	**A Sampling Based Method for Linear Parameter Estimation from Correlated Noisy Measurements [206]** **U. Guner, J. Lee, M. Realff**, Georgia Institute of Technology
A PID Automatic Tuning Method for Distributed-lag Processes [80] **M. Veronesi, A. Visioli** University of Brescia	**Experimental and Modeling Studies for a Reactive Batch Distillation Column [236]** **A. Bahar, C. Ozgen**, Middle East Technical University
New Tuning Rules for PI and Fractional PI Controllers [209] **J.J. Gude, E. Kahoraho**, University of Deusto	**On a New Approach for Self-optimizing Control Structure Design [105]** **S. Heldt**, Linde AG
An Online Algorithm for Robust Distributed Model Predictive Control [33]	**W. Al-Gherwi, H. Budman, A. Elkamel**, University of Waterloo

Notes

9:00	Plenary Lecture II (Sevgi Gönül Auditorium) **Stephen P. Boyd** Chair: S. Engell		
10:00	Coffee Break		
10:20	Keynote Lecture 2.1 (Sevgi Gönül Auditorium) **Volker Hessel** Chair: S. Hasebe		Keynote Lecture 2.2 (Gülgen Çağlar Auditorium) **Martin Guay** Chair: R. Findeisen
10:50	Break		
11:00	Session B.1 (Nesteren Bayramoğlu Auditorium) **Monitoring and Hybrid Control of Industrial Processing Systems** Chairs: D. Sarabia and C. Sonntag Invited Session	Session B.2 (Gülgen Çağlar Auditorium) **Nonlinear and Adaptive Control** Chairs: V. Bobal and H. Budman	Session B.3 (Fuat Bayramoğlu Auditorium) **Modeling and Simulation** Chairs: G. Fevotte and A. Secchi
11:00	Data Reconciliation and Optimal Management of Hydrogen Networks of a Real Refinery [212] D. Sarabia, S. Cristea, E. Gomez, C. Mendez J. Sola G. Gutierrez, C. de Prada University of Valladolid INTEC Petronor	Thermodynamic Approach for Lyapunov Based Control [167] H.G. Hoang, F. Couenne, C. Jallut Y. Le Gorrec Université Lyon 1 FEMTO-ST	Non-linear Model Order Reduction using Input to State Hammerstein Structures [155] O. Naeem, A.E.M. Huesman, O.H. Bosgra TU Delft
11:20	Performance Monitoring in Supermarket Refrigeration Systems - Synchronization of Refrigerated Display Cases [118] L. Chen, R. Wisniewski, Aalborg University T. Green, L.F.S. Larsen, R. Izadi-Zamanabadi, Danfoss A/S	Boundary Geometric Control of Co-current Heat Exchanger [26] A. Maidi, M. Diaf J.-P. Corriou University Tizi-Ouzou Institut National Polyt. de Lorraine	A Clean-Coal Control Technology Application Study: Modelling and Control Issues for a Coal Gasifier [224] S. Bittanti, A. De Marco, Politecnico di Milano L. Calloni, S. Canevese, V. Prandoni, CESI RICERCA
11:40	A Hierarchical Approach to Optimal Control of a Hybrid Chromatographic Batch Process [120] D. Gromov, J. Raisch S. Li TU Berlin Max-Planck-Institut, Magdeburg	Feedback Controller Design for the Four-Tank Process using Dissipative Hamiltonian Realization [162] N. Hudon, M. Guay Queen's University	Identification of Reaction Mechanisms with a Dynamic PFR Model [128] J.C. Schöneberger, H. Thielert H. Arellano-Garcia, G. Wozny TU Berlin Uhde GmbH
12:00	Sensitivity-based Predictive Control of a Large-scale Supermarket Refrigeration System [237] C. Sonntag, S. Engell M. Kölling TU Dortmund Hydro Aluminium	Robust Nonlinear Model Predictive Control using Volterra Models and the Structured Singular Value (μ) [19] R. Diaz-Mendoza, H. Budman University of Waterloo	Modeling and Simulation of the Polymeric Nanocapsule Formation Process [148] L. Ferreira, J.O. Trierweiler Federal University of Rio Grande do Sul
12:20	PWA Modelling and Co-ordinated Continuous and Logical Control of a Laboratory Scale Plant with Hybrid Dynamics [228] J. Hlava Technical University of Liberec	Output-feedback Dissipative Control of Exothermic Continuous Reactors [165] A. Schaum, J.A. Moreno, J. Alvarez, J. Diaz-Salgado National Autonomous University of Mexico	Predictive Modeling of Key Process Variables in Granulation Processes based on Dynamic Partial Least Squares [146] D. Ronen, C. Sanders, F. Doyle H. Tan, P. Mort UC Santa Barbara P&G Global Operations
12:40	Lunch Break		

Notes

Tuesday, July 14, 2009
Afternoon

14:00	**Keynote Lecture 2.3 (Sevgi Gönül Auditorium)** **Bjarne Foss** Chair: C. de Prada		**Keynote Lecture 2.4 (Gülgen Çağlar Auditorium)** **Claudio Scali** Chair: S. Shah
14:30	**Break**		
14:40	**Session B.4 (Nesteren Bayramoğlu Auditorium)** **Control and Estimation of Distillation Systems** Chairs: G. Pannocchia and J.U. Repke	**Session B.5 (Gülgen Çağlar Auditorium)** **Advances in Identification** Chairs: F. Gao and A. Palazoglu	**Session B.6 (Fuat Bayramoğlu Auditorium)** **Performance Assessment in Closed-loop Systems** Chairs: V. Kariwala and J. Romagnoli
14:40	**Geometric Estimation of Binary Distillation Columns [70]** J. Alvarez, C. Fernandez National Autonomous University of Mexico	**Identification of Low-order Unstable Process Model from Closed-loop Step Test [34]** T. Liu, F. Gao Hong Kong University of Science and Technology	**Multi-step Prediction Error Approach for MPC Performance Monitoring [218]** Y. Zhao, J. Chu, H. Su B. Huang Zhejiang University University of Alberta
15:00	**Distributed Optimization for Predictive Control of a Distillation Column with Output and Control-Input Constraints [164]** H. Scherer, E. Camponogara, A. Plucenio Federal University of Santa Catarina	**Multivariable System Identification for Integral Controllability - Computational Issues [222]** M. Darby, M. Nikolaou University of Houston	**Valve Friction and Nonlinear Process Model Closed-loop Identification [170]** R. Alvite Romano, C. Garcia University of Sao Paulo
15:20	**Comparison of Discrete and Continuous-discrete Observers for Composition Estimation in Distillation Columns [217]** A. Aguilera-González, A. Téllez-Anguiano, C.M. Astorga-Zaragoza, M. Adam-Medina Cenidet	**Internal Excitation Approaches for Closed-loop Identification of Processes Controlled by MPC [142]** O.A.Z Sotomayor D. Odloak Federal University of Sergipe University of Sao Paulo	**Control Loop Performance Monitoring using the Permutation Entropy of Error Residuals [199]** R. Ghraizi, C. de Prada E. Martinez University of Valladolid CONICET
15:40	**Coffee Break**		
16:00	**Composition Estimation of a Six-component Distillation Column with Temperature Measurements [95]** A. Frau, R. Baratti, University of Cagliari J. Alvarez, National Autonomous University of Mexico	**Identification of Low Order Models for Large Scale Systems [214]** S. Wattamwar, S. Weiland, T. Backx TU Eindhoven	**Performance Assessment of Decentralized Controllers [82]** A.Y. Sendjaja, V. Kariwala Nanyang Technological University Singapore
16:20	**Temperature Inferential Dynamic Matrix Control of Reactive Distillation Systems [189]** D. Dwivedi, N. Kaistha IIT Kanpur	**Identification of Nonlinear State-Space Models: The Case of Unknown Model Structure [99]** B. Gopaluni University of British Columbia	**Eliminating Valve Stiction Nonlinearities for Control Performance Assessment [4]** W. Yu, D. Wilson, B. Young University of Auckland
16:40	**A General Quadratic Performance Approach to Binary Distillation Control [216]** A. Rehm University of Applied Sciences Osnabrück	**Subspace Closed Loop Identification using the Integration of MOESP and N4SID Methods [101]** S.D. Miranda Borjas, C. Garcia University of Sao Paulo	**Valve Stiction Evaluation Using Global Optimization [152]** M. Farenzena, J.O. Trierweiler Federal University of Rio Grande do Sul
17:00	**Poster Sessions & Coffee Break (Sevgi Gönül Auditorium Symposium Area)**		

Poster Session PB.1 (17:00, Sevgi Gönül Auditorium Symposium Area) **Process Control Applications**	Poster Session PB.2 (17:00, Sevgi Gönül Auditorium Symposium Area) **Process Monitoring and Diagnosis**
Application of the IHMPC to an Industrial Process System [13] O. Carrapiço, A. Zanin M. Santos D. Odloak Petrobras ChemTech University of Sao Paulo	**Sensor Fault Detection and Isolation Observer Based Method for Single, Multiples and Simultaneous Faults: Application to a Waste Water Treatment Process [3]** D. Fragkoulis, G. Roux, B. Dahhou, LAAS-CNRS, France
Multivariable Control with Adjustment by Decoupling using a Distributed Action Approach in a Distillation Column [58] C. Marangoni, J.G. Teleken, L.O. Werle, R.A.F. Machado, A. Bolzan, Fed. Univ. of S. Catarina	**Batch Process Monitoring and Fault Diagnosis Based on Multi-Time-Scale Dynamic PCA Models [5]** Y. Yao, F. Gao, Hong Kong University of Science and Technology
Simultaneous Synthesis, Design and Control of Processes Using Model Predictive Control [221] M. Francisco, P. Vega S. Revollar, R. Lamanna Universidad de Salamanca Simón Bolívar University	**Fault Detection and Variation Source Identification based on Statistical Multivariate Analysis [17]** M.-D. Ma S.-S. Jang, D.S.-H. Wong, S.-T. Tseng Harbin Institute of Technology National Tsing-Hua University
An Efficient Multi-objective Model Predictive Control Framework of a PEM Fuel Cell [183] C. Ziogou, P. Seferlis, S. Voutetakis S. Papadopoulou Centre for Research and Technology Hellas (CERTH) Aristotle University of Thessaloniki	**Fault Detection and Diagnosis using Multivariate Statistical Techniques in a Wastewater Treatment Plant [123]** D. Garcia-Alvarez, M.J. Fuente, G. Sainz P. Vega University of Valladolid University of Salamanca
Design of an Adaptive Self-Tuning Smith Predictor for a Time Varying Water Treatment Process [194] K. Gajam, Z. Zouaoui, Z. Chen, Glyndwr University P. Shaw, United Utilities PLC	**On the Structure Determination of a Dynamic PCA Model using Sensitivity of Fault Detection [153]** M. Guerfel, K. Ben Othman, M. Benrejeb, National Engineering School of Tunis
Model Predictive Control of a Crude Distillation Unit - An Industrial Application [63] E.O. Kuzu, S. Kemaloglu, D. Gokce, O. Cetin, Turkish Petroleum Refineries Corporation	**LoopRank: A Novel Tool to Evaluate Loop Connectivity [157]** M. Farenzena, J.O. Trierweiler, Federal University of Rio Grande do Sul
Inferential Control of Depropanizer Column Using Wave Propagation Model [84] S. Gupta, MW Kellogg Ltd. A. Samanta, S. Ray, IIT Kharagpur	**Operational Flexibility of Heat Exchanger Networks [184]** M. Escobar, J.O. Trierweiler, Federal University of Rio Grande do Sul
Advanced Process Control Wide-Implementation in an Alumina Digestion Plant [108] R. Lopes, L. Vieira J. Aldi, A. Oliveira, J. Santos, M. Ribeiro J. Charr Honeywell do Brasil Alunorte - Alumina Norte do Brasil S.A. Honeywell International	**GPC Controller Performance Monitoring and Diagnosis Applied to a Diesel Hydrotreating Reactor [204]** A. Carelli, M. Souza Jr., Federal University of Rio de Janeiro
Dynamic Models and Open-Loop Control of Blood-Glucose for Type 1 Diabetes Mellitus [69] H.-P. Huang, S.-W. Liu, I.-L. Chien, Y.-H. Lin M.-J. Huang National Taiwan University Chang Gung University	**Early Determination of Toxicant Concentration in Water Supply using MHE [205]** F. Ibrahim, B. Huang, J. Xing, B. Jayasankar, University of Alberta
Nonlinear Model-Based Control of an Experimental Reverse Osmosis Water Desalination System [145] A. Bartman, P. Christofides, Y. Cohen, UCLA	
Periodic Control of Gas-phase Polyethylene Reactors [74] M. Al-haj Ali, E. Ali, King Saud University	**Model Based Control of Large Scale Fed-Batch Baker's Yeast Fermentation [76]** A. Hocalar, M. Türker, Pakmaya
Control of Nonlinear System - Adaptive and Predictive Control [75] J. Vojtesek, P. Dostal, V. Bobal, Tomas Bata University in Zlin	**Modeling and Control of Free Radical Co-Polymerization [203]** S. Raman, H. Ghodke, E. Ydstie, Carnegie Mellon University
Gas-lift Optimization and Control with Nonlinear MPC [192] A. Plucenio, D.J. Pagano, E. Camponogara, A. Traple, Federal University of Santa Catarina	**Simultaneous Regulation of Surface Roughness and Porosity in Thin Film Growth [169]** G. Hu, G. Orkoulas, P. Christofides, UCLA
Application of a New Scheme for Adaptive Unfalsified Control to a CSTR with Noisy Measurements [150] T. Wonghong, S. Engell, TU Dortmund	**A Strategy for Controlling Acetaldehyde Content in an Industrial Plant of Bioethanol [110]** F.R.M. Batista, A.J.A. Meirelles, University of Campinas

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8:30	**Plenary Lecture III (Sevgi Gönül Auditorium)** **Manabu Kano** Chair: Y. Arkun		
9:30	**Coffee Break**		
9:50	**Keynote Lecture 3.1 (Sevgi Gönül Auditorium)** **Mark Darby** Chair: T. Backx		**Keynote Lecture 3.2 (Gülgen Çağlar Auditorium)** **Denis Dochain** Chair: J. Alvarez
10:20	**Break**		
10:30	**Session C.1 (Nesteren Bayramoğlu Auditorium)** **Optimization and Optimal Control** Chairs: P. van den Hof and M. Nikolaou	**Session C.2 (Gülgen Çağlar Auditorium)** **Controller Tuning** Chairs: W. Heath and M. Hovd	**Session C.3 (Fuat Bayramoğlu Auditorium)** **Estimation** Chairs: B. Huang and J.B. Jorgensen
10:30	**Nonsmooth Optimization of Systems with Varying Structure [143]** M. Yunt, P.I. Barton Massachusetts Institute of Technology	**An Internal Model Control Approach to Mid-Ranging Control [30]** S. Gayadeen, W. Heath University of Manchester	**A New Process Noise Covariance Matrix Tuning Algorithm for Kalman Based State Estimators [86]** N.P.G. Salau, J.O. Trierweiler, A.R. Secchi Federal University of Rio Grande do Sul W. Marquardt, RWTH Aachen
10:50	**Real-time Optimization with Estimation of Experimental Gradient [117]** A. Marchetti, D. Bonvin B. Chachuat Ecole Polyt. Fédérale de Lausanne McMaster University	**Robust Optimization-based Multi-loop PID Controller Tuning: A New Tool and an Industrial Example [90]** M. Harmse, H. Singh, S. Gill R. Hughes IPCOS Aptitude Ltd. SABIC Petrochemicals R. Dittmar, West Coast University of Applied Sciences, Heide	**Observer Design for Systems with Continuous and Discrete Measurements [71]** C.P. Guillén Flores, J.P. García Sandoval, B. Castillo Toledo V. González Álvarez CINVESTAV-IPN University of Guadalajara
11:10	**Optimally Invariant Variable Combinations for Nonlinear Systems [175]** J. Jäschke, S. Skogestad Norwegian University of Science and Technology	**Auto-tuned Predictive Control based on Minimal Plant Information [11]** G. Valencia-Palomo, J.A. Rossiter University of Sheffield	**Soft Sensing for Two-phase Flow using an Ensemble Kalman Filter [32]** A. Gryzlov, R. Mudde M. Leskens TU Delft TNO Science and Industry
11:30	**Influence of Differences in System Dynamics in the context of Multi-unit Optimization [210]** F. Reney, M. Perrier, B. Srinivasan Ecole Polytechnique de Montréal	**The Effect of Tuning in Multiple-Model Adaptive Controllers: A Case Study [176]** E. Peymani Foroushani, A. Fatehi, A. Khaki Sedigh K. N. Toosi University of Technology	**Efficient Moving Horizon State and Parameter Estimation for the Varicol SMB Process [235]** A. Küpper, S. Engell M. Diehl TU Dortmund K.U. Leuven J.P. Schlöder, H.G. Bock, Universität Heidelberg
11:50	**A Model-Free Methodology for the Optimization of Batch Processes: Design of Dynamic Experiments [201]** C. Georgakis Tufts University	**Slug-flow Control in Submarine Oil-risers using SMC Strategies [119]** D.J. Pagano, A. Plucenio, A. Traple Federal University of Santa Catarina	**State Estimation for Large-scale Wastewater Treatment Plants [64]** J. Busch, W. Marquardt P. Kühl, J.P. Schlöder, H.G. Bock RWTH Aachen Universität Heidelberg
12:10	**Lunch Break**		

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13:15	**Keynote Lecture 3.3 (Sevgi Gönül Auditorium)** Chair: F. Doyle **Lakshminarayanan Samavedham**		**Keynote Lecture 3.4 (Gülgen Çağlar Auditorium)** Chair: G. Dünnebier **James J. Downs & Sigurd Skogestad**	
13:45	**Coffee Break**			
14:00	**Session C.4 (Nesteren Bayramoğlu Auditorium)** **Plantwide Control** Chairs: B. Foss and B. Srinivasan	**Session C.5 (Gülgen Çağlar Auditorium)** **Emerging Methods and Technologies** Chairs: A. Cinar and J. Lee	**Session C.6 (Fuat Bayramoğlu Auditorium)** **Process Monitoring** Chairs: C. Scali and H. Su	
14:00	**Feedforward for Stabilization [36]** M. Hovd R. Bitmead Norwegian Univ. of UC San Diego Science and Technology	**Monitoring, Analysis, and Diagnosis of Distributed Processes with Agent-based Systems [78]** A. Cinar, S. Perk, M. North, E. Tatara, F. Teymour M. Altaweel Illinois Institute of Technology Argonne National Laboratory	**On-line Statistical Monitoring of Batch Processes using Gaussian Mixture Model [8]** T. Chen J. Zhang Nanyang Techn. University Newcastle University	
14:20	**Efficient Cooperative Distributed MPC using Partial Enumeration [60]** G. Pannocchia S. Wright, B. Stewart, R. Rawlings University of Pisa University of Wisconsin	**Guaranteed Steady-State Bounds for Uncertain Chemical Processes [171]** J. Hasenauer, S. Waldherr, P. Rumschinski, S. Borchers, F. Allgöwer R. Findeisen University of Stuttgart University of Magdeburg	**Variability Matrix: A Novel Tool to Prioritize Loop Maintenance [190]** M. Farenzena, J.O. Trierweiler S.L. Shah Federal University of University of Rio Grande do Sul Alberta	
14:40	**Optimality of Process Networks [197]** M.R. Wartmann, B.E. Ydstie Carnegie Mellon University	**Extremely Fast Catalyst Temperature Pulsing: Design of a Prototype Reactor [219]** J. Stolte, T. Backx, O.H. Bosgra TU Eindhoven	**Soft Sensor Models: Bias Updating Revisited [65]** A. Quelhas J.C. Pinto Petrobras Federal University of Rio de Janeiro	
15:00	**Quasi-decentralized Scheduled Output Feedback Control of Process Systems Using Wireless Sensor Networks [225]** Y. Sun, N. El-Farra UC Davis	**Decision Oriented Bayesian Design of Experiments [213]** F. Anand, J. Lee, M. Realff Georgia Institute of Technology	**Data Derived Analysis and Inference for an Industrial Deethanizer [127]** F. Corona, M. Mulas R. Baratti, J. Romagnoli Helsinki University University of Cagliari of Technology	
15:20	**Bidirectional Branch and Bound Method for Selecting Controlled Variables [57]** V. Kariwala Y. Cao Nanyang Technological University Cranfield University	**Correlation-Based Pattern Recognition and Its Application to Adaptive Soft-Sensor Design [53]** K. Fujiwara, M. Kano, S. Hasebe Kyoto University	**Stiction Identification in Nonlinear Process Control Loops [15]** U. Nallasivam B. Srinivasan, R. Rengaswamy Clarkson University Texas Tech University	
15:40	**Plantwide Control of Fruit Concentrate Production [40]** M. van Dijk, S. Dubbelman, P. Bongers Unilever		**Stochastic Dynamical Nonlinear Behavior Analysis of a Class of Single-state CSTRs [98]** S. Tronci, M. Grosso, J. Alvarez R. Baratti National Autonomous University of Cagliari University of Mexico	
16:00	**Closing Ceremony** incl. presentation of the BTS Young Author Award (**Sevgi Gönül Auditorium**)			

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