Proceedings of the 2004 IEEE International Conference on Control Applications

Volume I
Pages 1 – 848

September 2-4, 2004
The Grand Hotel, Taipei, Taiwan

Sponsored by
IEEE Control Systems Society

Technically Co-sponsored by
Society of Instrument and Control Engineers, Japan (SICE)
European Union Control Association (EUCA)

Hosted by
Ministry of Education, Taiwan, R.O.C.
National Science Council, Taiwan, R.O.C.
National Taiwan University
– Center for Information and Electronics Technology

In Cooperation with
Chinese Automatic Control Society
IEEE Taipei Section
Advantech Co., Ltd.
MIRLE Automation Co.
# Table of Contents

Foreword .......................................................................................... i  
Conference Organization ................................................................. v  
International Program Committee .................................................. viii  
National Program Committee ........................................................... xi  

Proceedings of 2004 IEEE CCA  
Volume I

## ThA01 Aerospace and Vehicle Systems

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking Control for Laser-Driven Micro-Airplane</td>
<td>1</td>
</tr>
<tr>
<td>Kentarro Hoshino, Itsuro Kajiwara, Shinji Hara, Hiroyasu Ishikawa, and Daisuke Shiokata</td>
<td></td>
</tr>
<tr>
<td>Space Environment Information System for Mission Control Purposes: Real-Time Monitoring and Inference of Spacecraft Status</td>
<td>7</td>
</tr>
<tr>
<td>João Moura-Pires, Marta Pantoquilho, and Nuno Carlos Santos Simões Viana</td>
<td></td>
</tr>
<tr>
<td>Output Feedback Control of Practical Launch Vehicle Systems</td>
<td>13</td>
</tr>
<tr>
<td>Sunil Oberoi, S. Janardhanan, and Bijnan Bandyopadhyay</td>
<td></td>
</tr>
<tr>
<td>Cooperative Control of a Magnetically Levitated Interferometer</td>
<td>18</td>
</tr>
<tr>
<td>P. K. C. Wang, John Yee, Chi Yun Xia, Masaaki Mokuno, and Fred Y. Hadaegh</td>
<td></td>
</tr>
<tr>
<td>Discrete-Time Cooperative Control of a Faulty Mechanical System</td>
<td>26</td>
</tr>
<tr>
<td>Chunlong Hu and Bor-chin Chang</td>
<td></td>
</tr>
<tr>
<td>LMI-Based Anti-Windup Control for an Underwater Robot with Propellers Saturations</td>
<td>32</td>
</tr>
<tr>
<td>Jean-Pierre Folcher</td>
<td></td>
</tr>
</tbody>
</table>

## ThA02 Communication and Manufacturing Systems

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of Power-Assisted Crane System Using Direct Manual Manipulation</td>
<td>38</td>
</tr>
<tr>
<td>Takanori Miyoshi and Kazuziko Terashima</td>
<td></td>
</tr>
<tr>
<td>A MC-CDMA System Based on CMFB</td>
<td>45</td>
</tr>
<tr>
<td>Mei Liu, WeiDong Liu, DeQing Sun, Ruixue Li, and TaiXing Yang</td>
<td></td>
</tr>
<tr>
<td>Adaptive Optimal Predictive Power Control of Cellular CDMA Systems</td>
<td>51</td>
</tr>
<tr>
<td>Bore-Kuen Lee, Bor Sen Chen, and Sheng-Kai Chen</td>
<td></td>
</tr>
<tr>
<td>Cross-Coupled Control Design of Bi-Axis Feed Drive Servomechanism Based on Multitasking Real-Time Kernel</td>
<td>57</td>
</tr>
<tr>
<td>Chin-Sheng Chen and Yaw-Shih Shieh</td>
<td></td>
</tr>
<tr>
<td>Robust Extended Kalman Filter Applied to Location Tracking and Trajectory Prediction for</td>
<td></td>
</tr>
</tbody>
</table>
PCS Networks .................................................................................................................. 63
Pubudu N. Pathirana, Andrey V. Savkin, and Sanjay Jha
A Load-Balancing Distributed Platform Based on Differentiated Services for a Telecare
Application ...................................................................................................................... 69
Antonio de Barros Serra, Dominique Gaiti, Giovanni Barroso, and Jérôme Boudy

ThA03 Electromagnetic Mechanical Systems

Modeling Saturated Induction Motors .......................................................................... 75
Hamid Ouadi, F. Giri, and Luc Dugard
Fuzzy Sliding-Mode Control for Thin-Disc Ultrasonic Motor ........................................ 81
Fuh-Liang Wen, Chi-Yung Yen, and Minsun Ouyang
Control System Design for the PenduLIM: a Novel Integrated Architecture of Inverted
Pendulum and Linear Induction Motor ........................................................................... 87
Chi-Chun Cheng, Su-Chiun Wang, and Li-Chen Fu
Design and Control of a 2-Dimensional Electro-Magnetic Suspension Actuator .......... 93
Mei-Yung Chen, Chia-Feng Tsai, and Li-Chen Fu

ThA04 Control Applications 1: Motion Control

Switching Based Repetitive Control for Hard Disk Drives: Experiments on RIDR and RPTC
Methods .......................................................................................................................... 99
Hiroshi Fujimoto, Fumihiro Kawakami, and Seiji Kondo
A Simulation Model of Focus and Radial Servos in Compact Disc Players with Disc Surface
Defects ........................................................................................................................... 105
Peter Fogh Oggaard, Jakob Stoustrup, Palle Andersen, Mladen Victor Wickerhauser, and Henrik F. Mikkelsen
Time Localisation of Surface Defects on Optical Discs .................................................. 111
Peter Fogh Oggaard and Mladen Victor Wickerhauser
Developing a New Low-Cost XY Table Using Optical Pickup Head with Adaptive Controller
........................................................................................................................................ 117
Ping-Lang Yen, Wen-I Hsiao, and Tien-Sen Lu
Power Assist System for Omni-Directional Transport Wheelchair Using Fuzzy Reasoning
................................................................................................................................. 123
Hideo Kitagawa, Kazuhiro Terashima, Takanori Miyoshi, Juan Urbano, and Susumu Nishisaka
H∞ Control of a Three-Wheeled Electric Cart for Health Care ........................................ 131
Jin-Hua She, Yasuhiro Ohyama, Hiroyuki Kobayashi, and Tetsuya Suzuki

ThA05 Advanced Control Applications

Energetically Optimized Control of an Electric Arc Furnace ................................................. 137
Gregor Göröltler and H. Peter Jörgl
An Automatic Impedance Matching System for a Multi Point Power Delivery Continuous
Industrial Microwave Oven ............................................................................................. 143
Vanderlei C. Parro and Felipe M. Pait
ThA06  Fuzzy Control

A Robust Model Reference Fuzzy Control for Nonlinear Systems ........................................... 165
Tsai-Jiun Ren and Tien-Chi Chen

A Robust Fuzzy Model Following Observer-Based Control Design for Nonlinear System ............ 171
Huey-Jian Uang and Guo-Shing Huang

A GA-Based Fuzzy Logic Controller for the Retrofitted Wire Transport System of Wire-EDM .... 177
Mu-Tian Yan and Chi-Cheng Fang

Fuzzy Logic Control of Active Magnetic Bearing ................................................................. 183
Sohair F. Rezeka, Taher Awad, Amr Saafan, and Ahmed Y. Elmahdy

Design of a Hierarchical Fuzzy Vibration Absorber for a Continuum with a Moving Oscillator .. 189
Jonqlan Lin

Coke Oven Heating Temperature Fuzzy Control System ......................................................... 195
Yi'nan Guo, Dun-Wei Gong, and Jian Cheng

ThM01  Aerospace Applications

The Problem of Precision Missile Guidance Based on Multiple-Video Information Fusion with Bit-Rate Communication Constraints ................................................................. 199
Veerachai Malyavej, Ian R. Manchester, and Andrey V. Savkin

Using Multi-Frequency for GPS Positioning and Receiver Autonomous Integrity Monitoring .... 205
Yi-Hsueh Tsai, Fan Ren Chang, Wen-Chieh Yang, and Chia-Lung Ma

A New Super-Resolution Image Reconstruction Method Based on Hybrid Genetic Algorithm ... 211
Mei Liu, Wei Dong Liu, De Qing Sun, Guo Qiao Chen, and Hui Nian Liu

Application of a New Multivariable Controller Synthesis Approach to Nonlinear Liquid Propellant Engines ................................................................. 217
Hassan Karimi and Amir Nassirharand

Parametric Fault Modeling and Diagnostics of a Turbofan Engine ........................................ 223
Subhabrata Ganguli, Shardul Deo, and Dmitriy Gorinevsky

Estimation of Thrust and Mass Flow in a Jet Engine ............................................................. 229
Mattias Henriksson and Claes Breitholtz

ThM02  Real-Time Networked Control Systems
Telepresence Control in Packet Switched Communication Networks .......................... 236
Sandra Hirche and Martin Buss

State Feedback Controller Design of Networked Control Systems .......................... 242
Dong Yue, Qing-Long Han, and Chen Peng

Compensation Time-Varying Delays in Networked Control System via Delay-Dependent Stabilization Approach ................................................................. 248
Chang-Hong Wang, Yu-Feng Wang, and Hui-Jun Gao

Allocating IEC Function Blocks for Parallel Real-Time Distributed Control System ........... 254
Feng Xia, Zhi Wang, and Youxian Sun

Controller Design Based on Model Predictive Control for Real-Time Tracking Synchronization in Closed-Loop Control via Internet ............................................... 260
Changhong Wang, Lixian Zhang, and Qiyong Wen

ThM03 Motor Systems

A Simple Rotor Current Observer with an Arbitrary Rate of Convergence for the Brushless Doubly-Fed (Induction) Machine (BDFM) .......................................................... 266
Paul C. Roberts, Jan M. Maciejowski, Richard A. McMahon, and Timothy J. Flack

Optimal Positioning Control of a DC Servo Motor Using Sliding Mode ............................ 272
Gwo-Ruey Yu, Ming-Hung Tseng, and Yuan-Kai Lin

The Grey GM(2, 1) Integral Variable Structure Controller of Synchronous Reluctance Motor Drive ................................................................................................................. 278
Huann-Keng Chiang and Chih-Huang Tseng

A Gain Scheduled Robust Regulator for Torque Ripple Elimination of AC Permanent Magnet Motor Systems ................................................................. 284
Wai-Chuen Gan and Li Qiu

High Performance Position Controller for PMSM Drives Based on TMS320F2812 DSP .................. 290
Ying-Shieh Kung and Pin-Ging Huang

Performance Improvement of Practical Control Method for Positioning Systems in the Presence of Actuator Saturation .................................................. 296
Wahyudi Martono and Abdulghani Albagul

ThM04 Robot Manipulator Control

Bayesian Position Estimation of an Industrial Robot Using Multiple Sensors ..................... 303
Rickard Karlsson and Mikael Norrlöf

A Fault Tolerant Manipulator Robot Based on $H_2$, $H_{\infty}$, and Mixed $H_2/H_{\infty}$ Markovian Controls .......................................................... 309
Adriano A. G. Siqueira and Marco Henrique Terra

A Multiestimation-Based Scheme for Robustly Stable Adaptive Control of Robotic Manipulators .............................................................................................................. 315
Asier Ibeas-Hernandez and Manuel de la Sen

Stability of Inverse Jacobian Control for Robot Manipulator ............................................ 321
C. C. Cheah, C. Liu, and H. C. Liaw
Multiple Robot Force Control with Delayed Force Measurements ........................................... 327
Gustavo Montemayor and John T. Wen
Inverse Dynamics of Star Parallel Manipulator ........................................................................ 333
Stefan Staicu, Laurian Staicu, and Radu Rugescu

**ThM05** Automotive Applications

Nonlinear Stabilization of Slip in a Continuously Variable Transmission ........................................ 338
Tim W. G. L. Klaassen, Bram Bonsen, Koen G. O. van de Meerakker, Maarten Steinbuch, P. A. Veenhuizen,
and Frans E. Veldpaus
Identification of Cornering Stiffness During Lane Change Maneuvers ........................................ 344
Marc Arndt, E. L. Ding, and Thomas Massel
Integrated Longitudinal and Lateral Control for Vehicle Low Speed Automation ....................... 350
Saïd Mammar and Mariana Netto
A Signal Processing Algorithm for Compensating for Back Flow Effect in Intake Air Mass
Measurement in Internal Combustion Engines .............................................................................. 356
Toshihiro Aono and Takehiko Kowatari
Genetic Algorithm Optimization of Fuel Economy for PFI Engine with VVT-VCR .................... 364
Zhengmao Ye, Frank Washko, and Ming-Chia Lai
Sliding-Mode Control of Active Suspension Systems: Unit Vector Approach ........................... 370
Alireza Esna Ashari

**ThM06** Learning Control

Application of Iterative Learning to Tracking Control of a Piezoelectric System .................. 376
Chiang-Ju Chien, Fu-Shin Lee, Po-Jia Chen, and Jhen-Cheng Wang
Analysis and Comparison of Two Practical Iterative Learning Control Schemes .................. 382
Jian-Xin Xu, Tong Heng Lee, and Heng-Wei Zhang
Iterative Learning Control for Position Tracking of a Pneumatic Actuated X-Y Table ............ 388
Chih-Keng Chen and James Hwang
Development of an Adaptive Learning PD Control for Robotic System Applications .......... 394
Puren R. Ouyang and Wun-Jun Zhang
Learning Task Sequences from Scratch: Applications to the Control of Tools and Toys by a
Humanoid Robot ......................................................................................................................... 400
Artur M. Arsenio
The Model Reference Control by Auto-Tuning PID-Like Fuzzy Controller .......................... 406
Pin-Yan Tsai, Huang-Chu Huang, Yu-Ju Chen, and Rey-Chue Hwang

**ThP01** Control Applications in Aerospace Engineering

Vibration Isolation Controller Design by Frequency Shaping with Pole Placement Constraints .... 412
Yuichi Chida and Yoshiyuki Ishihara
Robust Control of Flexible Mechanical System by Utilizing Symmetry and Its Application to Large Space Structures ................................................................. 418
Tomoyuki Nagashio and Takashi Kida

Attitude Control of a Tethered Space Robot by Link Motion under Microgravity ............................................. 424
Masahiro Nohmi

A Study on a Missile Guidance System against a Randomly Maneuvering Air-to-Surface Missile .................. 430
Fumiaki Imado

A Study on Rendezvous Docking Control of HOPE ................................................................. 436
Yuji Hashizume and Fumiaki Imado

Robust $H_2$ Problem for LPV Systems and Its Application to Model-Following Controller Design for Aircraft Motions ................................................................. 442
Masayuki Sato

ThP02 Control Techniques Using Networks

Design Issues Arising in a Networked Control System Architecture ................................................................. 450
Daniel E. Quevedo, Graham C. Goodwin, and James S. Welsh

Theory and Experiments in Bilateral Teleoperation over the Internet ................................................................. 456
Paul Berestesky, Nikhil Chopra, and Mark W. Spong

Ethernet Switch Controller Design for Real-Time Control Applications ................................................................. 464
Feng-Li Lian, Yuan-Chung Tu, and Ching-Wei Li

An Analysis on Quantization Effects in $H^\infty$ Parameter Identification ................................................................. 468
Hideaki Ishii and Tamer Başar

Remote Stabilization via Time-Varying Communication Network Delays: Application to TCP Networks .......... 474
Emmanuel Witrant, Carlos Canudas de Wit, Didier Georges, and Mazen Alamir

Controller Switching Strategies for Constrained Mechanical Systems with Applications to the Remote Control Over Networks ................................................................. 480
Kiminao Kogiso and Kenji Hirata

ThP03 Applications of Force and Visual Feedback Control to Advanced Mechatronic Systems

A Measure of Golf Logo Contour Quality by Piecewise Interpolation of the Accumulation of Turn Angles ........ 485
Ku Chin Lin and Ming Feng Chang

Design and Analysis of an Interactive Motion Simulator with Multiple Bilateral Controllers in Virtual Entertainment System ................................................................. 491
Kuei-Shu Hsu, Ming-Guo Her, and Jih-Ming Chen

Using Haptic Manipulator in a Virtual Design Studio ......................................................................................... 497
Iat-Fai Leong, Jing-Jing Fang, Ming-June Tsai, and Yu-Hong Yen

An Image-Based Vehicle Guidance System ........................................................................................................... 503
Der-Cherng Liaw, Hung-Hsiang Li, Ming-Chi Chien, Wei-Chao Chen, Wei-Han Wu, Hung-Hsiang Chen,
Implementation of a Virtual Fishing System ......................................................... 509
Chih-Kai Huang, Ming-Shyan Wang, Jing Lee, Kun-Da Su, and Chia-Ming Chang

An Air Combat Simulator in the Virtual Reality with the Visual Tracking System and
Force-Feedback Components ................................................................. 515
Cheng-Ming Huang, Su-Chiun Wang, Chih-Fu Chang, Chin-I Huang, Yu-Shan Cheng, and Li-Chen Fu

ThP04 Control of Disk Drive Storage System

Short Seeking by Multi-Rate Digital Controllers for Computation Saving with Initial Value
Adjustment .................................................................................................. 521
Li Yang and Masayoshi Tomizuka

Robust Feedforward Tracking Servo System Considering Force Disturbance for Optical Disk
Recording System .................................................................................. 527
Kiyoshi Ohishi, Kazuyoshi Kuramochi, Toshimasa Miyazaki, Daichi Koide, and Haruki Tokumaru

Design of Seek Control of Hard Disk Drive Using Discrete-Time Sliding Mode Control .......... 533
Chung Choo Chung, Jae-Wan Jang, and Ho-Seong Lee

Tracking Error Signal Generation for a Raster Scanned Optical Disc System ...................... 539
Corey Drechsler and William Messner

Track Follow Servo Optimization for Disk Drives .................................................................. 545
Pushkar Hingwe and Gupta Akhil

Nanoposition Sensing and Control in HDD Dual-Stage Servo Systems ................................ 551
Chee Khiang Pang, Guoxiao Guo, Ben M. Chen, and Tong Heng Lee

ThP05 Bio-Systems

Viral Load Analysis of a Biodynamical Model of HIV-1 with Unknown Equilibrium Points ..... 557
Cheng-Fa Cheng and Chin-Teng Chang

Analytical Framework for Constraining the Initial Control Effort in a Biomechanical Model 562
Anindo Roy and Kamran Iqbal

Self-Organizing PID Control Design Based on DNA Computing Method .......................... 568
Chun-Liang Lin, Horn-Yong Jan, and Thong-Hsing Huang

Properties of Time-of-Flight Sensor; Using in Biochemical Laboratory ............................. 574
Milan Adamek and Miroslav Matýsek

Controlling Depth of Anesthesia Using PID Tuning: A Comparative Model-Based Study .......... 580
Khaled Ejaz and Jiann-Shiou Yang

ThP06 Neural Networks and Fuzzy Systems

Memory Efficient BFGS Neural-Network Learning Algorithms Using MLP-NETwork:
A Survey .................................................................................................... 586
Vijanth Sagayan Asirvadam, Seán Mcloone, and George W. Irwin

Adaptive Neural Predictive Control for Nonlinear Systems with Time-Delay ......................... 592
Fuzzy Neural Network for Identification and Control of DC Drive Systems
M. S. Mostafa, Mohamed A El-Bardini, Soliman M. Sharaf, and Mohamed M. Sharaf

Robust Adaptive Fuzzy Sliding-Mode Control with $H_\infty$ Tracking Performance for a Class of Nonlinear Systems
Chun-Fei Hsu, Tsu-Tian Lee, and Chih-Min Lin

**FrA01 Linear Control Synthesis and Modeling**

The Maximal Controllable Set for Open-Loop Unstable Systems under Input Saturation
Wen-Liang Abraham Wang, Hiro Mukai, and Yenming J. Chen

Parameterization of Stabilizing Controllers for Linear Systems with Unknown Inputs
Wei Xie and Toshio Eisaka

Optimal Control Using Structure at Infinity
Jovan D. Stefanovski and Georgi Marko Dimirovski

Closed Analytic Form of Time Maximum Disturbance for Stable Linear Systems
Kwan-Ho You and E. Bruce Lee

LMI Decentralized Controller Design for Stochastic Large-Scale Time-Delay Systems
Wen-Ben Wu, Pang-Chia Chen, Yeong-Hwa Chang, and Gong Chen

On Frequency Weighted Balanced Truncation Technique Retaining Hankel Singular Values
Abdul Ghafoor, Victor Sreeram, and Richard J. Treasure

**FrA02 Hybrid Systems**

Comparison of Three Procedures for the Identification of Hybrid Systems
J. H. G. Niessen, Aleksandar Juloski, Giancarlo Ferrari-Trecate, and Maurice P. M. H. Heemels

Online-Type State Feedback Design for Switched Systems with Time-Delay in Detection of Switching Signal
Guangming Xie and Long Wang

Optimal Sampled-Data Controller Design with Time-Multiplied Performance Index for Load-Frequency Control
Adirak Kancharatharuthai

Real-Time Control of a Hybrid Laboratory Plant Using a Receding Horizon Control Strategy
Adrian Gambier

A New Approach for Robust Model Predictive Control with an Application to an Air-Conditioning System
Vicente Delgado Moreira, Wagner Caradori do Amaral, and Paulo Augusto Valente Ferreira

Supervised Nonlinear Control of Hybrid System with Application to HVAC System
Chin-I Huang, Yu-Ming Chan, and Li-Chen Fu

**FrA03 Process Control**

Feedback Cooperative Control for Releasing Input Saturation
Leonardo Giovanini and Hao Xia
One-Spot Tuning PID Control of a Sulforane Process ........................................ 685

Toru Yamamoto and Kenzo Fujii
Dynamic Safety Margin Principle and Application in Control of Safety Critical Systems .......... 689

E. Badreddin and Mostafa Abdel-geliel
Comparison of Methods to Identify the Root Cause of Plant-Wide Oscillations .................. 695

Xiaoyun Zang and John Howell
Potential Energy Savings in Refrigeration Systems Using Optimal Set-Points .................. 701

Lars Sloth Larsen and Claus Thybo
A Modified Iterative Set-Point Optimization Strategy with Application to Batch Chromatography .......................................................... 705

Weihua Gao and Sebastian Engell

FrA04 Advanced Motion Control

Iterative Control of Dynamics-Coupling Effects in Piezo-Based Nano-Positioners for High-Speed AFM ......................................................... 711

Szuchi Tien, Qingze Zou, and Santosh Devasia

High Performance Motion Tracking Control ......................................................... 718

Benjamin Potsaid and John T. Wen

The Integrated Linear and Nonlinear Motion Control Design for Precise CNC Machine Tools ... 724

Zheng-Hong Tsai, Shy-Shiuh Yeh, and Pau-Lo Hsu

A Solid Modeling Based Mechatronics Approach to Machine Tool Servo Design ............... 730

Jia-Yush Yen and Ruey-Jeng Lee

Compensating for Spatially Repetitive Disturbance with Linear Parameter Varying Repetitive Control ................................................................. 736

Cheng-Lun Chen and George T.-C. Chiu

Design and Control of a Dual Stage Fast Tool Servo for Precision Machining .................. 742

Kalyanam Krishnamoorthy, Chi-Ying Lin, and Tsu-Chin Tsao

FrA05 Control Applications 2: Crane/Noise Control

Anti-Sway Control of a Rotary Crane via Switching Feedback Control .......................... 748

Ryou Kondo and Sei Shimahara

The Switching Fuzzy Controller of the Overhead Crane System ................................ 753

Cheng-Yuan Chang, Shih-Wei Hsu, and Kuo-Hung Chiang

Study of Operator Behavior, Learning, and Performance Using an Input-Shaped Bridge Crane ................................................................. 759

Attir Khalid, William E. Singhose, John Huey, Jason Lawrence, and Dave Frakes

Active Noise Control Systems with Optimized Secondary Path ................................ 765

Sen M. Kuo and Woon-Seng Gan

Robust Control of an Acoustic Cavity ................................................................. 771

Hemanshu R. Pota, Suwit Pulthasthan, and Jan R. Petersen
<table>
<thead>
<tr>
<th>Conference</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>FrA06</td>
<td>Neural Networks and Adaptive Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Discrete Multiestimation-Based Robust Adaptive Control Using an</td>
<td>Aitor Bilbao-Guillerna, Manuel de la Sen, Santiago Alonso-Quesada, and</td>
</tr>
<tr>
<td></td>
<td>Estimation Dead-Zone and Model Order-Reduction</td>
<td>Asier Ibeas-Hernandez</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Bayesian Approach to Modeling the Conditional Density of the</td>
<td>Randa Herzallah and David Lowe</td>
</tr>
<tr>
<td></td>
<td>Inverse Controller</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adaptive $H^\infty$ Control for Linear Slider with Friction</td>
<td>Kazuya Sato, Yoshio Mishima, Kazuhiro Tsuruta, and Ken-ichi Murata</td>
</tr>
<tr>
<td></td>
<td>Compensation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonlinear System Control Using Neural Networks Based on Trajectory</td>
<td>Yong Liu, Rui Huang, and J. Jim Zhu</td>
</tr>
<tr>
<td></td>
<td>Linearization</td>
<td></td>
</tr>
<tr>
<td>FrM01</td>
<td>Nonlinear Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unstable, Nonminimum Phase, Nonlinear Tracking by Trajectory</td>
<td>M. Christopher Mickle, Rui Huang, and J. Jim Zhu</td>
</tr>
<tr>
<td></td>
<td>Linearization Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Dynamic Feedback Tracking Design for Systems with Friction</td>
<td>Karim Khayati, Pascal Bigras, and Louis A. Dessaint</td>
</tr>
<tr>
<td></td>
<td>Using the LMI Formulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Synthesis of Absolutely Stabilizing PID Controllers and Its Application to a Ball and Wheel</td>
<td>Ming-Tzu Ho and Jun-Ming Lu</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonlinear Model Predictive Control Based on the Best-Step Newton</td>
<td>John T. Wen and Fernando Lizarralde</td>
</tr>
<tr>
<td></td>
<td>Algorithm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control of Nonholonomic Systems via Direct Gradient Descent</td>
<td>Kiyotaka Shimizu and Kenichi Tamura</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>—Variable Constraint Control Based Approach</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A Global-Stabilizing Near-Optimal Control for Real-Time Trajectory</td>
<td>Zhihua Qu, Jing Wang, and Clinton E. Plaisted</td>
</tr>
<tr>
<td></td>
<td>Tracking of Nonholonomic Chained Systems</td>
<td></td>
</tr>
</tbody>
</table>