Sixth World Congress on Intelligent Control and Automation

June 21-23, 2006
Dalian, China

Volume 1 of 24

SPONSORS

Sponsored by
Dalian University of Technology, China
Northeastern University, China

Co-Sponsored by
Dalian Maritime University, China
Shanghai Baosight Software Co., Ltd.

Technical Co-Sponsored by
IEEE Robotics and Automation Society
National Natural Science Foundation, China
Chinese Association of Automation
IEEE Control System Society, Beijing Chapter

Financially Supported by
National Natural Science Foundation, China
Ministry of Education, China
Shanghai Baosight Software Co., Ltd
Grandar Robotics Co., Ltd
Yokogawa Electric Corporation
K.C. Wong Education Foundation, Hong Kong
Siemens Ltd., China
Table of Contents

Plenary Talks

Hybrid Systems: Theory, Computation and Applications
Manfred Morari

Control over Unreliable Communication Links
Tamer Basar

Innovation Initiatives toward Year 2015 IA market
Akira Nagashima

The Multiscale Nature of Process Dynamics and Model-Predictive Control
George Stephanopoulos

Current NSF Robotics Developments and Activities Focusing on Robust Intelligence
George Lee

Deterministic and Real-Time Communication over Ethernet in EPA Control System
Jian Chu

The Information Integration Techniques in Automation
Liqian Cong

1-1: Complex networks: modeling, synchronization and control (Invited Session)

Synchronization in delayed discrete-time complex networks
Weigang Sun, Changpin Li, Zhengping Fan

Adaptive synchronization criteria of uncertain complex dynamical networks
Jin Zhou, Junan Lu, Jinhu Lv

Pinning Control of MLW-based Complex Dynamical Networks — Discrete Time Case
Zengqiang Chen, Linying Xiang, Zhenglin Liu, Zhezhi Yuan

Modeling the Evolving Internet Topology
Liya Song, Xiang Li, Xiaofan Wang

Inferring epidemiological control strategies from complex network models of disease propagation
Michael Small

Evolving Topology of Java Networks
Mingjiang Shi, Xiong Li, Xiaofan Wang

1-2: Artificial intelligence in meteorological prediction (Invited Session)

An Improved Method on Meteorological Prediction Modeling Using Genetic Algorithm and Artificial Neural Network
Long Jin, Cai Yao, Xiaoyan Huang

Study on Influence of Effectiveness Factors on Modular Fuzzy Neural Network Based Prediction Model
Jian Jin, Jingting Wang, Guoxiang Huang, Long Jin

Cloud Classification Based on Self-Organizing Feature Map and Probabilistic Neural Network
Ren Zhang, Yanlei Wang, Wei Liu, Weijun Zhu, Jiguang Wang

Optimization Retrieval of Subtropical High Dynamic Forecast Model Based on Genetic Algorithm
Ren Zhang, Mei Hong, Jinghong Min, Qihin Wan, Pinwen Guo

The Meteorological Prediction Model Study of Neural Ensemble Based on PSO Algorithms
Jiansheng Wu, Lingzhi Wang, Baocaiang Zhu
The Relationship Between the Multi-Collinearity and the Generalization Capability of the Neural Network Forecast Model
Kaiqing Lin, Long Jin, Jianling Lin, Binghuan Chen

1-3: Fuzzy control system and theory analysis (Invited Session)

Adaptive Fuzzy Output Tracking Control of Nonlinear Systems via Backstepping
Bing Chen, Shaocheng Tong, Xinying Wang

Local Stability Analysis and Synthesis of Fuzzy Systems with Time-Delay
Linna Zhou, Qingling Zhang, Shaocheng Tong

A New Approach to H∞ Control Design for T-S Fuzzy Time-delay Systems
Xiaoguang Yang, Xiaodong Liu, Qingling Zhang, Peiyong Liu

Decentralized Fuzzy Model Reference Tracking Control for Nonlinear Large-Scale Systems
Tao Wang, Shaocheng Tong

Decentralized Control for Discrete-Time Fuzzy Large-Scale Systems with Time-Delay
Shaocheng Tong, Wang Wei

Design of Controller for a Class of Uncertain T-S Fuzzy Model with Input Time-Delay
Changzhou Gong, Shuyan Li, Li Li

1-4: Reliable sensor networks (I) (Invited Session)

An Analysis on Information Dependability Measurement of Wireless Sensor Networks
Jin Wu, Jie Tong

Auction-Based Dynamic Coalition for Single Target Tracking in Wireless Sensor Networks
Jianxia Chen, Chuanchi Zang, Wei Liang, Haibin Yu

Reliable Application of Wireless Sensor Networks in Industrial Process Control
Peng Jiang, Huijin Ren, Lei Zhang, Zhi Wang, Anke Xue

Cross-Layer Design for the Security of Wireless Sensor Networks
Mingbo Xiao, Xudong Wang, Guangsong Yang

Wireless Sensor Network Design for Wildfire Monitoring
Yanjun Li, Zhi Wang, Yeqiong Song

An Energy-Aware Random Pairwise Keys Scheme in Wireless Sensor Networks
Bidi Ying, Huafang Chen, Wendaao Zhao, Peiling Qin

1-5: Fuzzy neural networks for feedback control systems (Invited Session)

Time-Delay Nonlinear System Modelling via Delayed Neural Networks
Jose de Jesus Rubio, Wen Yu, Xiaocai Li

Adaptive Fuzzy Control for Satellite
Ping Guan, Xiaolei Liu, Xiangjie Liu

Power Plant Coordinated Predictive Control Using Neurofuzzy Model
Xiangjie Liu, Tingting Yang, Jiachen Liu

An Effective Fuzzy PD Control for High Precision Servo Mechanisms
Ismael Morales-Mata, Yu Tong

PD Control of Overhead Crane with Velocity Estimation and Uncertainties Compensation
Rigoberto Tacqui, Wen Yu, Xiaocai Li

1-6: Nonlinear systems and control (Invited Session)

Robust Reliable Control for Neutral Delay Systems
Xiaoyuan Luo, Li Yang, Huilong Yang, Xinping Guan

On the Zero-State Detectability and Stability of Switched Dissipative Hamiltonian Systems
Liyang Zhu, Yiqun Wang
Output Tracking of Discrete-Time Piecewise Linear Systems via Error Feedback
Gang Feng, Yiqian Zhong

Global Robust Stabilization for a Class of Feedforward Systems with Dynamic Uncertainties
Minghua Zhu, Huang Jie

Stabilization of Discrete-time Bilinear Descriptor Systems
Guoping Li, Xiaomei Zhang, Hongji Tang, Lei Zhou

Robust PIP Tracking Control for NMSS Models with Additive Nonlinear Dynamics and Noises: Discrete Time Cases
L. Guo, H. Wang, P. C. Young, A. Chotai

1-7: Nonlinear control systems with discontinuity (Invited Session)

Synthesis and Stability Analysis of a Class of On-Off Feedback Systems
Daisuke Akasaka, Kangshi Liu

Modeling of Engine Intake System and Development of High Speed Simulation Method
Long Xie, Harutoshi Ogai, Yassuaki Inoue, Akira Ohtsu

Stabilization of Switched Systems via Common Lyapunov Function
Dazhao Cheng, Yahong Zhu, Qiaogui Hu

Flies Expansion-Based Bang-Bang Control Design and Its Application to Attitude Control of Missile
Yu Yao, Baoqing Yang, Fenghua He, Dazhao Cheng

Robust Tracking Control of Lagrange Systems with Discontinuity: a Filippov-Framework Approach
Takashi Nakasaka, Tie-long Shen

A Multi-Mode Switching-Based Command Tracking in Network Controlled Systems with Pointwise-in-Time Constraints and Disturbance Inputs
Ilya Kolmanovsky, Jing Sun

1-8: Networked control systems (Invited Session)

Queuing Packets in Communication Networks for Networked Control Systems
Yu-Chu Tian, David Levy, Moses O. Tunde, Tianlong Gu, Colin Fidge

Controller Design for Networked Fuzzy Systems
Xiefu Jiang, Qing-Long Han, Yu-Chu Tian

Fault Detection Filter Design for a Class of Networked Control Systems
Maoing Zhong, Qing-Long Han

Quasi T-S Fuzzy Models and Stable Controllers for Networked Control Systems
Huaying Fang, Hong Zhang, Yuwei Fang, Fang Yang

Suboptimal Guaranteed Cost Controller Design for Networked Control Systems
Chen Peng, Dong Yue

1-9: Robust control (Invited Session)

An LMI-Based Approach to Fuzzy Control Systems Analysis
Guang-Hong Yang, Jiuxiang Dong

Generalized Composite Nonlinear Feedback Control Technique to Track Non-Step References
Guoyang Cheng, Kemao Peng, Ben M. Chen, Tong H. Lee

Robust Control for 1to Stochastic Systems with Markovian Switching via Sliding Mode Design
Daniel W. C. Ho, Yugang Niu

Dilated LMI Characterization and a New Stability Criterion for Polytopic Uncertain Systems
Jun Xu, Liqiu Xie

Linear Stochastic Small Gain Theorem with State and Control-Dependent Noise
WeiHai Zhang, Huanshu Zhang, Yulin Huang
Infinite Horizon LQ Optimal Control for Discrete-Time Stochastic Systems
Yixin Huang, Weihai Zhang, Huanshui Zhang

1-10: Reliable sensor networks (II) (Invited Session)

A Diagonal-Based TTDD in Wireless Sensor Networks
Bidi Ying, Xiufang Chen, Wendao Zhao, Feilong Qiu

A New Method of Single Color Face Detection Based on Skin Model and Gaussian Distribution
Wantao Kong, Shoumin Zhu

A Study of Routing Protocols in Wireless Sensor Networks
Peng Jiang, Yu Wen, Jianzhong Wang, Xingfa Shen, Anke Xue

A Simple and Effective Data Compress Algorithm in Wireless Sensor Networks
Yanping Zhang, Jinming Chen, Buzhong Lin, Youxian Sun, Bin Wang

Research on Forest Fire Detection Based on Wireless Sensor Network
Guanghui Li, Jun Zhao, Zhi Wang

Wireless Communication System Design for Remote Monitoring
Jinhai Liu, Jianzhong Wang, Fang Dong, Peng Jiang, Anke Xue

1-11: Control of delay systems (Invited Session)

Adaptive Actuator Fault Compensation for Nonlinear Time-Delay Systems
Dan Ye, Guanghong Yang

Tracking Control with Multiple Input Delays for Continuous-Time Systems
Mei Liu, Huanshui Zhang, Guangren Duan, Buguang Xu

Sliding Mode Based Fuzzy Control of Stochastic Systems with Time-Delay
He Huang, Dianyi W C Ho, Yugen Niu

Exponentially Sliding Mode Control for Uncertain Input-Delay Systems Based on Invariant Conditions
Caibian Chen, Guang Yang

H-Infinity Control of Linear Systems with Multiple Input Delays with Application to ATM Network Congestion Control
Jun Lin, Lihua Xie, Huanshui Zhang

Delay-Dependent Stability for Time-Delay Systems with Nonlinear Perturbations
Penglei Li, Xingping Guan

1-12: Predictive control for hybrid systems (Invited Session)

Supervised Robustly Feasible Soft Switching Model Predictive Control with Bounded Disturbances
Jingsong Wang, Mietek A. Bodys

Exponential Stability of Discrete Time-Varying Perturbed Markov Switched Systems with Impulsive Jump
Lijun Gao, Yuqiang Wu

Robust Stability Analysis of CGPC
Zenghai Wang, Zengqiang Chen, Qinglin Sun, Zhixi Yuan

Multivariable Adaptive Decoupling Controller Using Hierarchical Multiple Models
Xin Wang, Zhengjie Wang, Shaoyuan Li, Hui Yang

Predictive Robust Control for Internet-based Teleoperation under Known Environment
Jin Quan, Qihong Chen

Model Predictive Control for Max-Plus-Linear Systems: Linear Programming Solution
Yuanyuan Zou, Shaoyuan Li

1-13: Time-delay systems (Invited Session)

Robust H Control for Discrete-Time Network-Based Control Systems
Engang Tian, Dong Yue, Xia Zhao

xii
Stabilization for Simple Systems via Delayed Proportional Controller
Gongcong Tang 349

Sliding Mode Control for Stochastic Jump Systems with Time-Delay
Yuanxing Xia, P. Shi, G.P. Liu, D. Rees 354

Delay-Dependent Output Feedback Guaranteed Cost Control of Time-Delay Systems over Communication Networks
Wen'an Zhang, Li Yu, Quxia Chen 359

A New Finite Sum Inequality for Delay-Dependent H Control
Xiaoming Zhang, Qing-Long Han, Min Wu 364

1-14: Networked and intelligent robotic systems (Invited Session)

Cross-Layer Optimization Schemes for Wireless Biosensor
Hongliang Ren, Max Q.-H. Meng, Xijun Chen 369

Developing a Hoeffdect Metric for Wireless Biomedical Sensor Networks
Hongliang Ren, Max Q.-H. Meng, Xijun Chen 375

3G based Network Solution to the Telehealthcare Robotic System
Polley R. Liu, Max Q.-H. Meng, Fanny F.L. Tong, X.J. Chen 381

Interactive Simulation of Progressive Cutting Model
Weiyu Zheng, Peter X. Liu, Chengliang Li, Peter X. Liu 386

Spatio temporal sensor network and mobile robot coordination in constrained environments
Jindong Tan, Xiaoming Shan 391

1-15: Path planning and control of nonlinear and constrained systems (Invited Session)

An Optimal Real-time Motion Planner for Vehicles with A Minimum Turning Radius
H. Yuan, J. Yang, Z. Qi, J. Kalougu 397

Disturbance Attenuation of Uncertain Nonholonomic Systems in Chained Forms
Yi Guo 403

Robust Motion/Force Control of Holonomic Constrained Nonholonomic Mobile Manipulators Using Hybrid Joints
Jun Luo, Zhijun Li, Aiguo Meng, Shuzhi Sam Ge 408

Controller Design for a Class of Nonregular-feedback-linearizable System
Zhendong Sun, S. S. Ge 413

Adaptive Neural Network Control Based on Trajectory Linearization Control
Yong Liu, Rui Huang, Jim Zhu 417

1-16: Intelligent control systems (Invited Session)

Mixed H2/Hinf Control of Flexible-link Manipulators Based on Fuzzy Singularly Perturbed Model
Fuchun Sun, Chong Guo, Ni Zhao, Huaping Liu 422

Hybrid GA and Backstepping based Trucking Control of a Mobile Robot
Simon X. Yang, Jianping Yu, Max Q.-H. Meng 427

Modbus/TCP based Network Control System for Water Process in the Firepower Plant
Qing Liu, Yingnai Li 432

Hybrid Control of Inverse Model Wavelet Neural Network and PID and Its Application to Fin Stabilizer
Hui Li, Chen Guo, Hongzhang Jin 436

Collective Cooperation Inspired by Stigmergy Strategy
Ting Lan, Shirong Liu, Simon X. Yang 441