## 2017 International Conference on Advanced Mechatronic Systems (ICAMechS 2017)

Xiamen, China 6 – 9 December 2017



IEEE Catalog Number: ISBN:

CFP1718R-POD 978-1-5386-2603-0

### **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.

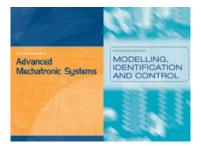
#### \*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP1718R-POD
ISBN (Print-On-Demand):	978-1-5386-2603-0
ISBN (Online):	978-1-5386-2602-3
ISSN:	2325-0682

#### 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





# 2017 International Conference on Advanced Mechatronic Systems

December 6-9, 2017 Xiamen, China



### CONTENTS

Advanced nonlinear control in robotics (ThuM01)	
Robot hand learning from multiple demonstrations using dynamics motor primitives	
Rui Huang, Chenguang Yang, Fan Yang, Zhijun Li	1
Kylin: a transformable track-wheel hybrid robot	
Shaozun Hong, Meiping Wu, Junhao Xiao, Xiaohong Xu, Huimin Lu	7
Open eyes influence on electroencephalography signals for constructing neural network classifiers as mobile robot control brain-computer	
interface	
Takuya Hayakawa, Jun Kobayashi	13
Trajectory redraw of quadruped crawling robot based on improved Kalman filtering strategy for pipeline detection	
Xudong Liu, Xiaodong Xian, Qiqi Jiang, Ping Gan	18
Six-legged robot capable of climbing various columnar objects	
Ryushi Aoyagi, Yoshihiro Homma, Kazuyuki Ito	24
Complex systems control and applications I (ThuM02)	
Adaptive robust output control of nonlinear delayed chaotic systems	
Sanyan Chen, Yuchao Wang, Peng Huang, Xiaoyan Chen	30
Adaptive control of uncertain nonlinear systems with time-varying parameters and disturbances	
Jing Zhou	36
A modified design on operator-based nonlinear vibration control for an L-shaped arm with load	
Yanfeng Wu, Mingcong Deng, Longguo Jin	42
Operator-based nonlinear position control for a micro-hand by using image information	
Keisuke Ueno, Mingcong Deng	46
A class of redesigned adaptive robust controllers for nonlinear delayed systems	
Yuchao Wang, Zhiliang Kang, Lijia Xu, Hansheng Wu	51
Optimization methods and applications (ThuM03)	
The application of convolution neural network in wheelhub classification	- 7
Siqi Liang, Hao Dang, Muyi Sun, Kai Han, Aini Dai, Xiaoguang Zhou	57
Application of fuzzy control in four wheel steering control system	
Yanling Cao, Mengnan Qiao	62
Optimal control and operator based robust control for nonlinear system with output nonlinearity from sensor	<i>.</i> –
Shuhui Bi, Xuehua Yan, Zhaoxia Xu, Lei Wang	67
Topology optimization of shields on large AC motors in conceptual design phase	
Qi Lu	73

Advanced intelligent control in robotics and mechatronics (ThuP01)	
Characterising energy efficiency in maching processes: a milling case	
Hui Hong, Chaoyong Zhang, Leilei Meng, Guangdong Tian, Jun Yu	83
Hybrid disassembly planning and end-of-life decision making for mechanical product recovery optimization	
Qinyu Tian, Yicong Gao, Yixiong Feng, Qiong Lin, Guangdong Tian	89
Decoupled image-based visual servoing for robotic manufacturing systems using gain scheduled switch control	
Ahmad Ghasemi, Wen-Fang Xie	94
Deflection angle tuning of electromagnetically driven MEMS with underdamping compensation	
Ruili Dong, Yonghong Tan	100
A discrete-time robust anti-windup tracking approach with application to a piezoelectric nano-stage	
Pengbo Liu, Peng Yan, Zhen Zhang	104
Control methods improvement and applications I (ThuP02)	
Immune algorithm for minimal Steiner tree problems	
Li-Ping Zhang, Zong-Xiao Yang, Qingyun He, Daming Cai	110
Experimental study on heat transfer performance of evaporative cooler	
Tao He, Peng Tian, Qingxuan Lei	116
Numerical simulation of natural convection in a three-dimensional hermetic cavity	
Tao He, Qingxuan Lei, Peng Tian	123
Numerical simulation of smoke particle motion	
Zhiyuan Wang, Bo Liu, Fali Hou, Wudan He	131
An analysis of features of English for science and technology from the view of cognitive linguistics	
Qian Li	135
Advanced control systems design-theory and applications (ThuP03)	
A screw-less solution for snake-like robot assembly and sensor integration	
Guoyuan Li, Peter Verdru, Wei Li, Houxiang Zhang, Juan G Gómez	139
Concept design and simulation of a water proofing modular robot for amphibious locomotion	
Guoyuan Li, Rodrigo Urbina, Houxiang Zhang, Juan G. Gomez	145
A novel MCDM-based approach for disassembly line balancing problem	
Yuezhao Qiang, Yu Lin, Guangdong Tian	151
A novel method for measuring the moisture distribution of grain in the silo based on microwave image technology	
Chi Zhang, Xiaoguang Zhou, Zhichao Shi, Ludi Wang	157
Impact dynamics in robotic and mechatronic systems	162
Farhad Aghili, Chun-Yi Su	163
Advanced complex systems design I (ThuE01)	
Clustering routing protocol for wireless sensor networks based on improved QPSO algorithm	
Rongwei Li, Dongxue Wang	168
Disturbance observer based target tracking control for unmanned aerial vehicles	
Kenan Yong, Qingxian Wu, Mou Chen	173

 $Non-fragile\ passive\ filtering\ for\ networked\ systems\ with\ sensor\ failures$ 

Maneuvering vehicle tracking over the energy harvesting sensor networks

Yong Xu, Jun-Yi Li, Chang Liu 184

	104
Developments in analysis and control I (ThuE02)	
Tire-road friction coefficient estimation based on longitudinal measurements	
Juqi Hu, Subhash Rakheja, Youmin Zhang	190
Shear wind estimation with quadrotor UAVs using Kalman filtering regressing method	
Zhewen Xing, Yaohong Qu, Youmin Zhang	196
Real-time path planning and following for nonholonomic unmanned ground vehicles	
Mohammad Ali Askari Hemmat, Zhixiang Liu, Youmin Zhang	202
Adaptive fuzzy-based backstepping control of a 3DOF helicopter testbed with dead-zone	
Chuang Li, Kai Quan, Bing Xiao, Xuebo Yang	208
Robust adaptive multivariable bi-limit homogeneous higher-order sliding mode flight control for AHVs with actuator faults	
Peng Li, Xiang Yu, Youmin Zhang	214
Control and optimization (ThuE03)	
Design and study of a novel magneto-rheological regenerative suspension system	
Liu Jian, Xinchen Wang, Tianxin Chen, Enrong Wang, Hailong Zhang	220
Design of improved double closed-loop controlled interleaved parallel buck circuit	
Xinchen Wang, Enrong Wang, Hailong Zhang	224
Nonlinear systems modeling, control and applications (FriM01)	
Indoor pedestrian tracking by combining recent INS and UWB measurements	
Lili BU, Yong Zhang, Yuan XU	244
Trial of applying the unbalance vibration compensator to axial position of the rotor with AMB	
Daishi Saito, Shinji Wakui	249
Frosting dynamic model of fin and tube heat exchanger based on R404A refrigerant	
Zhiyuan Wang, Meng Wang, Zhaolin Wang, Bo Liu, Wudan He, Fali Hou	261
Mechatronic systems analysis and design (FriM02)	
Design of energy-efficient pinellia ternata harvesting device based on green concepts	
Qiong Fan, Zhouyang Ding, Zhigang Jiang, Qian Wu, Zongran Ding, Zhang Zhang	265
Fall detection for elderly persons using a depth camera	
Xiangbo Kong, Lin Meng, Hiroyuki Tomiyama	269
A study on effective diameter of shrink-fitted shaft-hub connection	
Wei Song, Zhanchi Liu, Qi Lu	274
Complex systems analysis and control (FriM03)	
Classification methods of restraining temperature change of air spring based on heat equivalent circuit	
Yutaro Katayama, Shinji Wakui	284
Distribution estimation method of the radial run-out of the antifriction bearing	
Li-hong LI, Jishun Li, Yujun Xue, Tongshuai Yu, Yongjian Yu	290

Fuzzy control strategy for a tri-energy hybrid bus

Kegang Zhao, Yuke Zhen, Yanjun Huang, Hong Wang, Amir Khajepour, Zhihao Liang 297

Developments in analysis and control II (FriN01)	
Clustering analyzing of undergraduate schools based on k-means algorithm	
Juan Yang	309
Umbrella wheel - a stair-climbing and obstacle-handling wheel design concept	217
A piece-wise beam model for shafts with abrupt changes of section in gearbox products	312
A piece-wise beam model for shafts with dorupt changes of section in gearbox products Zhanchi Liu, Wei Song, Qi Lu	318
	010
Advanced complex systems design II (FriN02)	
Evaluation of water quality for the beilun gulf and zhenzhu bay by principal component analysis	
Minghui Ou, Shan Liang, Ru Zhang, Qingyu Xiong	324
An active acceleration system to mitigate/avoid underride rear-end crashes	
José A. Romero, Alejandro A. L. Guzmán, Frank Otremba	329
A new method in wheel hub surface defect detection: object detection algorithm based on deep learning	
Kai Han, Muyi Sun, Xiaoguang Zhou, Guanhong Zhang, Hao Dang, Zhicai Liu	335
Complex systems control and applications II (FriN03)	
A stability condition of zero dynamics of a discrete time systems with backward triangle sample and hold	
Minghui Ou, Shan Liang, Tong Liu, Cheng Zeng	339
An opentype liftable two-axis rotary turntable for visual tracking	2.44
Jun Qian, Yangang Ma, Zhengyu Wang	344
Experimental backstepping adaptive sliding mode control of hydraulic position servo system Hai-Peng Ren, Xuan Wang	349
	517
Control design improvement (FriP01)	
Target detection in mine based on fusion of color and edge information	
Xiaodong Xian, Qiqi Jiang, Xudong Liu	355
Streamline-based obstacle avoidance for mobile robot with curvature constraints	
Pei-Li Kuo, Han-Jung Chou, Chun-Hsun Wang, Jing-Sin Liu	361
Nonlinear tracking control of a series manipulator based on linear filter reduction	
Jipeng Li, Aihui Wang	367
Inverse dynamics control of a parallel robot based on RBF neural network	
Wudai Liao, Wang Liang, Aihui Wang	372
Simulation research of a six degrees of freedom manipulator kinematics based on MATLAB toolbox	
Junming Xiao, Wei Han, Aihui Wang	376
Advanced control system design (FriP02)	
Human activity recognition based on improved artificial bee colony algorithm	
Xuekai Sun, Haiquan Wang, Fanbing Zhu	381
Design and experimental studies of an active vibration absorber with adjustable time delay	
Yixia Sun	386
An iterative projection method for generalized support vector machine	
Xiaomin Oi, Shengjun Wen	392

Trajectory planning of NAO robot arm based on target recognition Rui Zhai, Shengjun Wen Advanced intelligent control design (FriP03) Temperature and humidity control with a model predictive control method in the air-conditioning Jingyun Liu, Ping Li 408Robust consensus tracking control of second-order nonlinear systems without using velocity information Zi-Jiang Yang 413 Pressure control of fuel pressure regulator based on BP neural network PID Yangfeng Qiu, Yongyi He, Pengfei Cheng 419 Sensitivity on operator-based nonlinear control design of uncertain system with disturbance Mengyang Li, Mingcong Deng 423 Operator-based integral sliding mode control design for WPT system via magnetic resonance coupling Kodai Masaki, Xudong Gao, Mingcong Deng, Yuichi Noge 429 **Control of mechatronic systems (FriQ01)** Contrastive analysis of dynamics modelling and parameters identification for a flexible finger joint based on cable-driven series elastic actuator Zhengyu Wang, Yuan Li, Bin Zhou, Lingtao Yu, Jun Qian, Daoming Wang 435 Study on fault simulation of hvdc system based on PSCAD/EMTDC Liancheng Xiu, Zhiliang Kang 441 Innovation and practice of talent training model of mechanical and electronic engineering based on CDIO ideas Jingjing Zhao, Xiaoguang Zhou, Haiyan Sheng 446 Prediction of apple internal qualities using hyperspectral imaging techniques Xiaoyan Chen, Tao Pang, Huanliang Tao, Mingyue Lin, Haotian Yang 450 Improving the tracking performance of atomic force microscope scanner with the modified rate-dependent prandtl-ishlinskii model Linlin Li, Guoying Gu, LiMin Zhu 456

#### Control methods improvement and applications II (FriQ02)

New second order sliding mode control design for course-keeping control of ship with input saturation	
Meilin Li, Cheng Liu, Tieshan Li, C. L. Philip Chen	462
Sliding mode control of chaos vibrations in 7-DOF nonlinear active vehicle suspension	
Zhiyong Yang, Yu Zhou, Shan Liang	467
Integral sliding mode tracking control of piezoelectric positioning platform with compensating hysteresis-observer	
Rui Xu, Miaolei Zhou	472
MPC based path tracking control for autonomous vehicle with multi-constraints	
Mengyuan Chen, Yue Ren	477
Fast and reliable control of steering mirrors with application to free-space communication	
Salim Ibrir, Chun-Yi Su, Boon S. Ooi, M. Slim Alouini	483

Estimation and control of nonlinear systems (FriQ03)

A neural network based modeling approach for a piezoelectric-actuated stick-slip positioning device

Long Cheng, Ang Wang 489

Seal friction characteristics of a hydro-pneumatic suspension strut

Yuming Yin, Subhash Rakheja, Paul-Emile Boileau, Fan Yang 495

- Haiquan Wang, Fanbing Zhu, Wudai Liao 398
  - 403

Vibration control of nonlinear systems (FriE01)	
Development of power system infrastructure model for the island communities: A case study in a remote island of Indonesia	
Meita Rumbayan	515
Solving the stereo matching problem using an embedded GPU for a real-time application	
Pedro Aguiar, Sebastien Varrier, Jorge Lozoya, Martha Lopez, Damien Koenig and Juan C. Tudon-Martinez	519
Active vibration control of gear drive system based on FxRLS algorithm	
Shun-an Luo, Feng Zhang, Yong Zhang, and Ji-ming Lin	525
Modeling and analysis of actuators (FriE02)	
Analysis and modeling a novel hydro-pneumatic damper	
Dezhao Lin, Di Gong, Bin Ma, and Zhihong Lin	529
Co-simulation study on vibration control of multistage gear transmission system based on multiple control algorithms	
Wen-hao Sun, Feng Zhang, Hai-yan Li, Han Wang, and Shun-an Luo	532
Performance assessment of shell oil fractionator	
Chen-bing Zheng and Chun-qing Huang	539
Analysis and control of nonlinear systems (FriE03)	
LuGre model for a Magneto-Rheological (MR) fluid damper	
Bing Ma, Fan Yang, Di Gong, and Zhanjun Wei	545
Multi-stage gear vibration active control based on AFPID control	

Two step approach for robust anti-windup design

Han Wang, Feng Zhang, Hai-yan Li, Wen-hao Sun, and Shun-an Luo 549

Chen-bing Zheng, Xiao-yu Wu, and Chun-qing Huang 555