

REGULAR PAPERS

Control Theory and Applications

Function Approximation Technique Based Adaptive Control for Chaos Synchronization between Different Systems with Unknown Dynamics

Y. Wang, Y. Bai, and M. Svinin 2611

Robust Control of Networked System and Its Application

M. Li and Y. Chen 2622

Ahead-time Approach to Carrot-chasing Guidance Law for an Accurate Trajectory-tracking Control

S. H. Lee, S. W. Hur, Y. Y. Kwak, Y. H. Nam, and C.-J. Kim 2634

Sliding Manifold Design for Higher-order Sliding Mode Control of Linear Systems

B. Veselić, Č. Milosavljević, B. Draženović, and S. Huseinbegović 2652

Event-triggered Sliding Mode Fault-tolerant Consensus for a Class of Leader-follower Multi-agent Systems

B.-C. Zheng, L. Guo, and K. Li 2664

Quantized Sliding Mode Control for Networked Markovian Jump Systems under Round-robin Protocol: The Output Feedback Case

L. Nie, D. Chen, and J. Hu 2674

Finite-time Event-triggered Extended Dissipative Control for a Class of Switched Linear Systems

H. Gao, K. Shi, H. Zhang, and J. Xia 2687

Fixed-time Consensus Tracking for Second-order Leader-follower Multi-agent Systems with Nonlinear Dynamics Under Directed Topology

C. Wang, C.-L. Liu, Y.-Y. Chen, and Y. Zhang 2697

Two-stage Gradient-based Recursive Estimation for Nonlinear Models by Using the Data Filtering

Y. Ji, Z. Kang, and C. Zhang 2706

Efficiency Optimization Control of an IPMSM Drive System for Electric Vehicles (EVs)

Q.-M. Wu, Y. Zhan, M. Zhang, X.-P. Chen, and W.-P. Cao 2716

MPPT Adaptive Controller of DC-based DFIG in Resistances Uncertainty

Y. Sun, S. Yan, B. Cai, Y. Wu, and Z. Zhang 2734

Commutation Torque Ripple Suppression in Three Phase Brushless DC Motor Using Open-end Winding

Q. Huang, L. Luo, Y. Zhang, and J. Cao 2747

Type-2 Fuzzy Adaptive Output Feedback Saturation Control for Photovoltaic Grid-connected Power Systems

T. Wang, X. Zhang, and Y. Li 2759

Sensor Fault Diagnosis and Unknown Disturbances Estimation of High Switching Frequency Single-phase PWM Rectifier

H. U. K. Jadoon, D. Huang, N. Qin, and Z. Gong 2769

Adaptive Safety Motion Control for Underactuated Hovercraft Using Improved Integral Barrier Lyapunov Function

M. Fu, T. Zhang, and F. Ding 2784

Adaptive Dynamic Surface Control for Finite-time Tracking of Uncertain Nonlinear Systems with Dead-zone Inputs and Actuator Faults

G. Xue, F. Lin, S. Li, and H. Liu 2797

Observer-based Stabilization of Uncertain Switched Linear Systems with Admissible Edge-dependent Switching Signals

J. Yang, Y. Qiao, X. Bu, and Z. Hu 2812

Stable Switching PD Control Using Hunt-Crossley Model for a Press Platform

J.-U. Nam, Y.-J. Yang, and T.-W. Yoon 2821

Algorithm of Gaussian Sum Filter Based on SGQF for Nonlinear Non-Gaussian Models

C. Qian, C. Song, S. Li, Q. Chen, and J. Guo 2830

Tuning the Diagnoser-based Approach for Diagnosability Analysis of Finite Automata

A. Bousif and M. Ghazel 2842

Robot and Applications

Synthetic Deep Neural Network Design for Lidar-inertial Odometry Based on CNN and LSTM

H. Son, B. Lee, and S. Sung 2859

Design of a Sliding Mode Controller with Fuzzy Rules for a 4-DoF Service Robot

L. Bao, D. Kim, S.-J. Yi, and J. Lee 2869

Mitigation of a Heading Drift in Pedestrian Dead-reckoning Caused by the Sensor Bandwidth

J. H. Lee and C. G. Park 2882

2D-VPC: An Efficient Coverage Algorithm for Multiple Autonomous Vehicles

V. G. Nair and K. R. Guruprasad 2891

Dynamic Parameter Identification Based on Lagrangian Formulation and Servomotor-type Actuators for Industrial Robots

C. Urrea and J. Pascal 2902

On the Disturbance Rejection Control of Flexible-joint Robot: A GPIO based Approach

H. Wang, Y. Zhang, X. Chen, X. Tang, and I.-M. Chen 2910

Intelligent Control and Applications

Relaxed Sum-of-squares Approach to Stabilization of Polynomial Fuzzy Systems

L. Li and K. Tanaka 2921

INDEXED IN Science Citation Index Expanded (SciSearch), SCOPUS, INSPEC, Google Scholar, ProQuest, Current Contents/Engineering, Computing and Technology, EI-Compendex, Journal Citation Reports/Science Edition, OCLC, Summon by Serial Solutions, Korea Citation Index.

A Joint Publication of Institute of Control, Robotics and Systems and the Korea Institute of Electrical Engineers

IJCAAS

International Journal of Control, Automation, and Systems

EDITOR-IN-CHIEF

Professor Keum-Shik Hong
School of Mechanical Engineering
Pusan National University
Busan 46241, Korea
E-mail: kshong@pusan.ac.kr

EDITORS

Hyo-Sung Ahn, Gwangju Institute of Science and Technology, Gwangju, Korea
hyosung@gist.ac.kr

Kyoung Kwan Ahn, University of Ulsan, Ulsan, Korea
kkahn@ulsan.ac.kr

Bin Jiang, Nanjing University of Aeronautics and Astronautics, Nanjing, China
binjiang@nuaa.edu.cn

Hamid Reza Karimi, Politecnico di Milano, Milan, Italy
hamidreza.karimi@polimi.it

Euntai Kim, Yonsei University, Seoul, Korea
etkim@yonsei.ac.kr

Won-jong Kim, Texas A&M University, TX, USA
wjkim@tamu.edu

Jay H. Lee, KAIST, Daejeon, Korea
jayhlee@kaist.ac.kr

Young Il. Lee, Seoul National University of Science and Technology, Seoul, Korea
yilee@seoultech.ac.kr

Myotaeg Lim, Korea University, Seoul, Korea
mlim@korea.ac.kr

Fumitoshi Matsuno, Kyoto University, Kyoto, Japan
matsuno@me.kyoto-u.ac.jp

Yoshito Ohta, Kyoto University, Kyoto, Japan
yoshito_ohta@ikyoto-u.ac.jp

Chan Gook Park, Seoul National University, Seoul, Korea
chanpark@snu.ac.kr

Ju Hyun Park, Yeungnam University, Kyongsan, Korea
jessie@ynu.ac.kr

PooGyeon Park, POSTECH, Pohang, Korea
ppg@postech.ac.kr

Guang-Hong Yang, Northeastern University, Liaoning, China
yangguanghong@ise.neu.edu.cn

ASSOCIATE EDITORS

Changsun Ahn, Pusan National University, Busan, Korea

Shun-ichi Azuma, Nagoya University, Nagoya, Japan

Juhoon Back, Kwangwoon University, Seoul, Korea

Joonbum Bae, UNIST, Ulsan, Korea

David Banjerdpongchai, Chulalongkorn University, Bangkok, Thailand

Mohammed Chadli, University of Paris-Saduy, Univ Evry, Paris, France

Xiao-Heng Chang, Bohai University, Liaoning, China

Jun Cheng, Guangxi Normal University, Guilin, China

Min-Sen Chiu, National University of Singapore, Singapore

Sunglok Choi, Seoul National University of Science and Technology, Seoul, Korea

Andrea Cristofaro, University of Camerino, Camerino, Italy

Feng Ding, Jiangnan University, Jiangsu, China

Truong Quang Dinh, University of Warwick, Coventry, UK

Jiuxiang Dong, Northeastern University, Liaoning, China

Takahiro Endo, Kyoto University, Kyoto, Japan

Alessandro Giuseppe, University of Rome "La Sapienza" Rome, Italy

Yonghao Gui, Aalborg University, Aalborg East, Denmark

Wei He, University of Science and Technology Beijing, Beijing, China

Le Van Hien, Hanoi National University of Education, Hanoi, Viet Nam

Chuan Hu, University of Alaska Fairbanks AK USA

Changchun Hua, Yanshan University, Qinhuangdao, China

Pilwon Hur, GIST, Gwangju, Korea

Yingmin Jia, Beihang University, Beijing, China

Maolin Jin, KIRO, Pohang, Korea

Kang-Hyun Jo, University of Ulsan, Ulsan, Korea

Nam H. Jo, Soongsil University, Seoul, Korea

Niket S. Kaisare, Indian Institute of Technology Madras, Chennai, India

Mathiyalagan Kalidass, Bharathiar University, Tamilnadu, India

Tae-Koo Kang, Sangmyeong University, Cheonan, Korea

Muhammad Jawad Khan, National Univ. of Sciences and Technology, Islamabad, Pakistan

Arkadii Kim, The Russian Academy of Sciences(Ural Branch), Ekaterinburg, Russia

Chang-Sei Kim, Chonnam National University, Gwangju, Korea

DaeEun Kim, Yonsei University, Seoul, Korea

Do Wan Kim, Hanbat National University, Daejeon, Korea

Jong-Han Kim, Kyung Hee University, Gyeonggi, Korea

Jongrae Kim, University of Leed, UK

Jung Hoon Kim, POSTECH, Pohang, Korea

Kyeong-Hwa Kim, Seoul National University of Science and Technology, Seoul, Korea

Min Young Kim, Kyungpook National University, Daegu, Korea

Seungkeun Kim, Chungnam National University, Daejeon, Korea

Sung Hyun Kim, University of Ulsan, Ulsan, Korea

Kyoungchul Kong, KAIST, Daejeon, Korea

Joseph Kwon, Texas A&M University, TX, USA

Ohmin Kwon, Chungbuk National University, Cheongju, Korea

Dongjun Lee, Seoul National University, Seoul, Korea

Ho Jae Lee, Inha University, Incheon, Korea

Hyeon beom Lee, Kyungpook National University, Daegu Korea

Jong Min Lee, Seoul National University, Seoul, Korea

Kyoobin Lee, Gwangju Institute of Science and Technology, Gwangju, Korea

Sangmoon Lee, Kyungpook National University, Daegu, Korea

Hongyi Li, Guandong University, Guangzhou, China

Yangmin Li, The Hong Kong Polytechnic University, Kowloon, Hong Kong

Young-Hun Lim, Gyeongsang National University, Gyeongnam, Korea

Jianxing Liu, Harbin Institute of Technology, Heilongjiang, China

Lei Liu, Liaoning University of Technology, Liaoning, China

Yajuan Liu, North China Electric Power University, Beijing, China

Zehui Mao, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Changki Mo, Washington State University Tri-Cities, WA, USA

Saleh Mobayen, University of Zanjan, Zanjan, Iran

Jun Moon, Hanyang University, Seoul, Korea

Un-Chul Moon, Chung-Ang University, Seoul, Korea

Aldo Jonathan Munoz-Vazquez, Texas A&M University, Texas, USA

Noman Naseer, Air University, Islamabad, Pakistan

Quoc Chi Nguyen, Ho Chi Minh City University of Technology, Ho Chi Minh, Viet Nam

Vu Huy Nguyen, Kodiak Sciences, Inc., CA, USA

Kwang-Kyo Oh, Suncheon National University, Jeonnam, Korea

Sehoon Oh, DGIST, Daegu, Korea

Yongping Pan, National University of Singapore, Singapore

Wenhai Qi, Qufu Normal University, Rizhao, China

Muhammad Rehan, Pakistan Institute of Engineering and Applied Sciences, Pakistan

Seok Chang Ryu, Texas A&M University, TX, USA

Jongho Shin, Chungbuk National University Chungbuk, Korea

Young Ik Son, Myongji University, Kyunggi, Korea

Xiaoje Su, Chongqing University, Chongqing, China

Ning Sun, Nankai University, Tianjin, China

Sangkyung Sung, Konkuk University, Seoul, Korea

Yang Tang, East China Univ. of Sci. and Tech., Shanghai, China

Mien Van, Queen's University Belfast, Belfast, Ireland

Huanqing Wang, Carleton University, Ottawa, Canada

Yueying Wang, Shanghai University, Shanghai, China

Augie Widyotriatmo, Institut Teknologi Bandung, Indonesia

Zheng-Guang Wu, Zhejiang University, Zhejiang, China

Xiangpeng Xie, Nanjing Univ. of Posts and Telecommunications, Jiangsu, China

Bin Xu, Northwestern Polytechnical University, Xian, China

Seung-Joon Yi, Pusan National University, Pusan, Korea

Jun Yoneyama, Aoyama Gakuin University, Kanagawa, Japan

Sung Jin Yoo, Chung-Ang University, Seoul, Korea

Son-Cheol Yu, POSTECH, Gyeongbuk, Korea

Dan Zhang, University of Technology Zhejiang, Zhejiang, China

Xian-Ming Zhang, Swinburne University of Technology, Melbourne, Australia

Zhijia Zhao, Guangzhou University, Guangzhou, China

Guangdeng Zong, Qufu Normal University, Shandong, China

Lei Zou, Brunel University London, Middlesex, UK

Former EDITOR-IN-CHIEF

Myung Jin Chung, KAIST, Daejeon, Korea

Jin Bae Park, Yonsei University, Seoul, Korea

Jae-Bok Song, Korea University, Seoul, Korea

Young Hoon Joo, Kunsan Nat'l University, Chonbuk, Korea

MANUSCRIPT EDITOR Kaeun Choi, ICROS, Korea

Information for Authors

International Journal of Control, Automation, and Systems

Aims and Scope

The International Journal of Control, Automation, and Systems (IJCAS) is a monthly published periodical. As of 2003, it is a joint publication of Institute of Control, Robotics and Systems (ICROS) and the Korean Institute of Electrical Engineers (KIEE). The purpose of the journal is to establish a high quality archival periodical presenting state of the art, recent advances and practical applications of control, automation and systems engineering. In the journal, the three technical areas included are: Control Theory and Applications, Robot and Applications, Intelligent Control and Applications.

Two types of contributions are regularly considered:

(1) *Regular Papers*: Presentation of significant research, development or application of control concepts and normally limited to ten pages in final form.

(2) *Technical Notes and Correspondence*: Brief technical notes, comments on published areas or established control topics, corrections to papers, and notes published in the Journal. Manuscripts up to five pages are allowed in final form.

Conditions of Publication

Submission of a manuscript implies that it has not been copyrighted, published, submitted, nor accepted for publication elsewhere. All submitted manuscripts should be as concise as possible. Longer manuscripts may be considered, but have a proportionately lower probability of acceptance.

Peer-Review

All manuscripts are treated as confidential and peer-reviewed by anonymous reviewers selected by Editorial Board. The corresponding author is notified possible of the editor's decision to accept, reject, or request revision of manuscripts. When the final revised manuscript is completely acceptable according to IJCAS format and criteria, it is scheduled for publication in the next available issue.

Submission by Internet

Manuscripts can be submitted electronically via our website. This can be done by visiting the IJCAS website at <http://ijcas.com> and following the instructions. Only PDF file is accepted and authors should embed all the fonts needed to print the paper.

Manuscript Preparation

(1) Manuscripts must be written in English and the TeX source-file should be prepared in a LaTeX format (by using IJCAS.cls). Other file formats are accepted also as long as the manuscript is typeset in two-column and single-space structure; however the conversion process by the IJCAS may result in 1 to 3 month delay in the printing process.

(2) Authors of an accepted manuscript will be required to provide the text of the final version of their manuscript on the website <http://ijcas.com>.

(3) The preferred formats for graphics are TIF, EPS, and JPG formats. High-contrast line figures should be prepared with 600 dpi resolution, and color/gray figures should be prepared with more than 300 dpi resolution. The color figures should be clearly seen even though they are printed back and white printers.

(4) Brief biographies and either clear glossy photographs of the authors or TIF, EPS, and JPG files of the figures should be added in the last page.

Manuscript Style

(1) First page must contain:

- Title of paper, author(s), and affiliation(s);
- Abstract (not exceeding 300 words for Regular Papers or 75 words for Technical Notes and Correspondence, and without equations, references, or footnotes);
- Keywords (at least four key words or phrases);
- Complete mailing address and e-mail address;
- Preferred address for correspondence and return of proofs; and,
- Footnotes (if desired) containing acknowledgement of financial or other support.

(2) Provide an introduction that includes a statement of the purpose and contribution of the paper.

(3) References should be cited within the text in numerical order according to their order of appearance. The numbered reference citation should be enclosed in brackets, e.g., "KF is proven in [1]. Dorf [2] introduced another method."

(4) References should appear at the end of the paper. Example: [1] G. D. Hong, "Call for papers," *IEEE Trans. on Automatic Control*, AC-7, no. 1, pp. 100-105, January 1999.

[2] C. H. Dorf, *Modern Control Systems*, Addison-Wesley, 1999.

[3] G. D. Hong, "A way to success," *Proc. of American Control Conference*, San Diego, pp. 106-110, June 1999.

Copyright

It is the policy of the IJCAS to own the copyright to the technical contributions that it publishes on behalf of the interests of the IJCAS, its authors, and their employers, and to facilitate the appropriate reuse of this material to others.

Page Charge and Reprints

Authors should be charged for publication to make a contribution to defray part of the publication cost. A page charge form (USD 300 under 8 pages) is sent to the authors with proofs. Author will receive 1 hard copy of journal only if the reprint charge (USD 100) is honored.

Overlength Page Charge

An overlength page charge is imposed on all papers exceeding 8 pages in length, including illustrations. The charge is USD 100 per page for each page over the first eight.

CONTACT OFFICE : Institute of Control, Robotics and Systems, Suseo Hyundai-Ventureville 723, Bamgogae-ro 1-gil 10, Gangnam-gu, Seoul 06349, Korea. Tel: +82-2-6949-5806 Fax: +82-2-6949-5807, E-mail: journal@ijcas.com

□ Published by Institute of Control, Robotics and Systems and the Korean Institute of Electrical Engineers. Distributed by Springer. Printed by Dream Media. □ This journal is published monthly; on the first day of each month. □ This journal was supported by the Korean Federation of Science and Technology Societies Grant funded by the Korean Government (Ministry of Education). □ Subscription information is available at <http://www.ijcas.com> where full-text is available. □ It is printed on acid-free paper. □ For the actual version of record please always check the online version of the publication.

Institute of Control, Robotics and Systems The Korean Institute of Electrical Engineers

Suseo Hyundai-Ventureville 723, Bamgogae-ro 1-gil 10, Gangnam-gu, Seoul 06349, Korea
TEL: +82-2-6949-5806 / Fax: +82-2-6949-5807 / e-mail: journal@ijcas.com / <http://www.ijcas.com>