2006 SICE-ICASE
International Joint Conference

Busan, Korea
18-21 October 2006

Volume 10 of 13
## Table of Contents

Anomaly Detection for Autonomous Inspection of Space Facilities using Camera Images .............................................. 4299
Yuki Sakai, Hideyuki Tanaka, Takehisa Yairi, Kazuo Machida

Image-based Structural Analysis of Building using Line Segments and their Geometrical Vanishing Points ............ 4304
Hoang-Hon Trinh, Kang-Hyun Jo

A neuromorphic system for detecting an approaching object inspired by insect vision .................................. 4310
Hiroisugu Okuno, Tetsuya Yagi

A Novel Color patch System for the Large League MIROSOT .............................................................................. 4314
DongHun Lee, DoEun Kim, KyungHun Hwang, ChaeWook Chung, TaeYong Kuc

Probabilistic Sensor Models for Multiple Objects Localization Problem .............................................................. 4319
Junichi Shibata, Takehisa Yairi, Hirofumi Kanazaki, Youhei Shirasaka, Kazuo Machida

Object’s Depth Ordering in Monocular Image by Using Multi-Neural Network Classification .......................... 4325
Y. Lila, C. Lursinsap, R. Lipikorn

Real-Time Hand Motion Estimation Using EMG Signals with Support Vector Machines ............................... 4331
Masahiro Yoshikawa, Masahiko Mikawa, Kazuyo Tanaka
# Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of Wrist Motion Pattern by EMG</td>
<td>4337</td>
</tr>
<tr>
<td>Tadahiro Oyama, Yuji Matsumura, Stephen Karungaru, Yasue Mitsukura, Minoru Fukami</td>
<td></td>
</tr>
<tr>
<td>Proposal for the Extraction Method of Personal Comfort and Preference by the EEG Maps</td>
<td>4342</td>
</tr>
<tr>
<td>Satomi Ota, Shin-iichio Ito, Yasue Mitsukura, Minoru Fukami</td>
<td></td>
</tr>
<tr>
<td>Response of Brain Waves to Periodic Flicker Stimuli – Entrainment and Steady-State Visually Evoked Potentials</td>
<td>4346</td>
</tr>
<tr>
<td>Seiji Nishifuji, Shogo Tanaka</td>
<td></td>
</tr>
<tr>
<td>Autonomic Nervous Activity Revealed by a New Physiological Index max Based on Cross-Correlation between Mayer-Wave Components of Blood Pressure and Heart Rate</td>
<td>4352</td>
</tr>
<tr>
<td>Akira Tanaka, Norihiro Sugita, Makoto Yoshizawa, Yasuyuki Shiraiishi, Tomoyuki Yambe, Shin-Ichi Nitta</td>
<td></td>
</tr>
<tr>
<td>Training Hidden Markov Model Structure with Genetic Algorithm for Human Motion Pattern Classification</td>
<td>4356</td>
</tr>
<tr>
<td>Shuhei Manabe, Toshiharu Hatanaka, Katsuyuki Uosaki, Noriyuki Tabuchi, Tomoyuki Matsumi, Ken Hashizume</td>
<td></td>
</tr>
<tr>
<td>Coordinated Control and Experiments of Pushing an Object by Using Two Unmanned Vehicles</td>
<td>4361</td>
</tr>
<tr>
<td>Li-Sheng Wang, Shun-I Wu</td>
<td></td>
</tr>
<tr>
<td>Fuzzy Model and Control for Hybrid Systems Using Averaging Techniques</td>
<td>4366</td>
</tr>
<tr>
<td>Kuang-Yow Lian, Hui-Wen Tu, Jieh-Jang Liou</td>
<td></td>
</tr>
<tr>
<td>Design and Implementation of an Advanced Visual Guided Mobile Robot: ShinPu #1</td>
<td>4372</td>
</tr>
<tr>
<td>Jong-Hann Jeon, Jin-Hong Lai, Yao-Chang Huang, Pei-Ting Kan</td>
<td></td>
</tr>
<tr>
<td>Analysis of Formation Control and Communication Pattern in Multi-Robot Systems</td>
<td>4378</td>
</tr>
<tr>
<td>Chou-Yauh Mai, Feng-Li Lian</td>
<td></td>
</tr>
<tr>
<td>Analysis of a Behavior Based Nonholonomic Wheeled Mobile Robot Control With Hybrid System Approach</td>
<td>4384</td>
</tr>
<tr>
<td>Chih-Fu Chang, Li-Chen Fu</td>
<td></td>
</tr>
<tr>
<td>Contamination Control Strategy based on Particle Flow Behavior near Fast Moving Devices in Flat Panel Display Fabrication Cleanroom</td>
<td>4390</td>
</tr>
<tr>
<td>Hyunsik Chio, Hyuntae Cho, Giljun Kim, Hoeryung Kim, Manseung Seo</td>
<td></td>
</tr>
<tr>
<td>Automatic Multi-Stage Bumpless Mode Switching Type Digital Controller for PWM Power Amplifier using Load Estimation</td>
<td>4396</td>
</tr>
<tr>
<td>Koji Matsushita, Ryosuke Okazaki, Kohji Higuchi, Kazushi Nakano, Tatsuyoshi Kajikawa, Fumihiro Chino</td>
<td></td>
</tr>
<tr>
<td>A Resolution Improving Method of Digital PWM using Pulse Composite Technique</td>
<td>4402</td>
</tr>
<tr>
<td>Eiji Takegami, Kohji Higuchi, Kazushi Nakano, Satoshi Tomioka, Kazushi Watanabe</td>
<td></td>
</tr>
<tr>
<td>Development of Train Communication Network Simulator for Tilting Train</td>
<td>4408</td>
</tr>
<tr>
<td>Su-Gil Lee, Seong-Ho Han, Young-Jae Han</td>
<td></td>
</tr>
<tr>
<td>A Study on Mechanical Characteristics for Induction Motor of Rolling Stock</td>
<td>4412</td>
</tr>
<tr>
<td>Young-Jae Han, Seog-Won Kim, Ki-Hwan Kim, Tae-Hyeong Lee, Hun-Mo Koo</td>
<td></td>
</tr>
<tr>
<td>A Study on Fault Diagnosis and Performance Evaluation of Propulsion System</td>
<td>4416</td>
</tr>
<tr>
<td>Young-Jae Han</td>
<td></td>
</tr>
<tr>
<td>Sliding Mode Control Based on Self-Recurrent Wavelet Neural Network for Five-link Biped Robot</td>
<td>4420</td>
</tr>
<tr>
<td>Sin Ho Lee, Jin Bae Park, Yoon Ho Choi</td>
<td></td>
</tr>
<tr>
<td>Chattering Free Sliding Mode Control</td>
<td>4426</td>
</tr>
<tr>
<td>Kyoungho Kim, Jin Bae Park, Yoon Ho Choi</td>
<td></td>
</tr>
<tr>
<td>Robust Passivity Based Control with Sliding Mode for DC-to-DC Converters</td>
<td>4430</td>
</tr>
<tr>
<td>Tae-Won Kim, Seung Kyu Park, Ho Hyeon Ahn, Tae Sung</td>
<td></td>
</tr>
<tr>
<td>H-Infinity Design for Parametric Uncertain System</td>
<td>4433</td>
</tr>
<tr>
<td>Jung E. Son, Haniph A. Latchman, Kwang J. Kim</td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents

Robust Adaptive Control for Nonlinear Systems with H8 Tracking Performance: Dynamic Surface Design .......................... 4439
Sung Jin Yoo, Jin Bae Park, Yoon Ho Choi

Study on Development of High Performance Shoes with Human Compatibility .................................................. 4445
Yasuhiro Hayakawa, Yousuke Ikeda

Adaptive Linearization for Power Amplifier in OFDM Systems ................................................................. 4449
Yuanming Ding, Yan Liu, Itthisek Nilkanthang, Akira Sano

The Stabilization Loop Design for a Two-Axis Gimbal System Using LQG/LTR Controller .......................... 4453
Ki-Jun Seong, Ho-Gyun Kang, Bo-Youn Yeo, Ho-Pyeong Lee

Parallel Implementation of M-Step Kalman FIR Filter Using LQG/LTR Controller ........................................ 4458
Zhonghua Quan, Sheng Ai Xuan, Soohee Han, Wook Hyun Kwon

Fixed-lag Minimum Variance FIR Smoothers for Continuous-time Systems ................................................ 4463
Bo Kyu Kwon, Soohee Han, Wook Hyun Kwon

Robust Kalman Filtering based on Multiple Hypothesis Techniques .......................................................... 4468
Ick-Ho Whang, Won-Sang Ra

Recursive Weighted Robust Least Squares Filter for Frequency Estimation .................................................... 4472
Won-Sang Ra, Ick-Ho Whang

An Estimation and Compensation of the Friction in an Inverted Pendulum ................................................. 4477
Duckgee Park, Dongkyoung Chwa, Suk-Kyo Hong

Adaptive Estimation of Time-Varying Parameters and Its Application to Time-Derivative Tracker ................ 4482
Shuhei Wada, Kouichi Mitsunaga, Haruo Suemitsu, Takami Matsuo

Frequency Estimator with LMI-type Adaptive Update Law .............................................................. 4488
Kentaro Adachi, Haruo Suemitsu, Takami Matsuo

A Range Estimation Algorithm for Anti-Aircraft Artillery ................................................................. 4494
Seung-Youn Lee, Suk-Jong Kang, Do-Jong Kim

Proposal of Distributed Architecture for Micromirror Image Generation in Maskless Optolithography System .................................................. 4500
Jaeman Choi, Younghun Jin, Haeryung Kim, Manseung Seo

Fast Estimation of the Load Performance Characteristics for DC Motors .................................................. 4505
Hyo Jik Lee, Jong Kwang Lee, Byung Suk Park, Ji Sup Yoon, E Sok Kang

Decoupling Control of A Class of Underactuated Mechanical Systems Based on Sliding Mode Control .......... 4509
Mun-So Park, Dongkyoung Chwa, Suk-Kyo Hong

Semi-Global Stabilization of A Class of Underactuated Euler-Lagrange Systems by Backstepping Approach .................................................. 4514
Mun-So Park, Dongkyoung Chwa, Suk-Kyo Hong

Sliding Mode Controller with Piecewise Linear Sliding Surface for Second-Order Nonlinear Systems .......... 4519
Miran Kim, Dong Jun Kim, Kang-Bak Park

Low-Pass Filter Property of Dynamic Output Feedback Passivation Controller ........................................ 4524
Young I. Son, Nam H. Jo, Hyungbo Shim, Kab-Il Kim

A New Method of Discretization of the Continuous-Time Controllers Based on the Matching of Frequency Response .................................................. 4530
Yuichi Chida, Tomoaki Nishimura

Robust 1 1 Filtering with Pole Constraint in a Disk via Parameter-dependent Lyapunov Functions ............ 4536
Liang He, Guang-Ren Duan, Ai-Guo Wu
Table of Contents

A Singular Perturbation-like Method to Compensate the Effect of Fin-Actuator Dynamics in Nonlinear Missile Control ........................................................................................................................................................................... 4540
Jin-Woo Hong, Joon-Hyung Yeom, Seong-Ho Song, In-Joong Ha

Switching Surface Design for Mismatched Uncertain Systems with Time Delay: An LMI Approach ........................................................................................................................................................................... 4545
Min Kook Song, Jin Bae Park, Young Hoon Joo

Digital Redesign of Linear Time-Invariant Systems: Integral Quadratic Constraint Approach ........................................................................................................................................................................... 4550
Do Wan Kim, Jin Bae Park, Young Hoon Joo

Characterization of Impact Response of a Plant Stem ........................................................................................................................................................................... 4554
Hitomi Itoh, Yusaku Fujii

Absolute Stability Margin in Missile Guidance Loop ........................................................................................................................................................................... 4559
Jong-Ju Kim, Joon Lyou

A Nonlinear Controller Design Based on the Interpolation Chart ........................................................................................................................................................................... 4564
Ying-Jing Shi, Guang-Fu Ma

Discretization of Nonlinear systems with Delayed Multi-Input via Taylor Series and Scaling and Squaring Technique ........................................................................................................................................................................... 4568
Yuanliang Zhang, Kit To Chong

Eigenstructure Assignment for Linear Systems with Constraints on Input and Its Rate via State Feedback, A Parametric Approach ........................................................................................................................................................................... 4572
Yu Xue, Guang-Ren Duan

Observer Design in High-order Descriptor Linear Systems ........................................................................................................................................................................... 4578
Guang-Ren Duan, Hai-Hua Yu

The Effects of Negative Driving Torque in Servomotor Drivers ........................................................................................................................................................................... 4584
Pakorn Serikitkankul, Hiroaki Seki, Masatoshi Hikizu, Yoshitsugu Kamiya

The Effects of Controller Saturation on Dynamic Characteristics of Commercial Positioning Systems and Their Countermeasures ........................................................................................................................................................................... 4588
Pakorn Serikitkankul, Hiroaki Seki, Masatoshi Hikizu, Yoshitsugu Kamiya

On Dynamic Diffeomorphism for Feedback Linearizable Uncertain Systems ........................................................................................................................................................................... 4592
Ho-Lim Choi, Min-Sung Koo, Jong-Tae Lim

The method for improvement of a position control with an analog signal ........................................................................................................................................................................... 4597
Ryuichi Oguro, Ray Nakashima, Hideki Honda, Teruo Tsuji

Analysis of a Nonlinear Web-Tension Control System of a High-Speed Gravure Printing Machine ........................................................................................................................................................................... 4601
Bong-Ju Lee, Sung-Hwan Kim, Chul-Goo Kang

A Control Approach and Design Consideration of PV/Diesel Hybrid Distributed Generation System Using Dual Voltage Source Inverter for Weak Grid ........................................................................................................................................................................... 4607
H. Dehbonei, S.R. Lee, S.H. Ko, C. V. Nayar

Development of automatic temperature control system in blast furnace ........................................................................................................................................................................... 4613
Woosung Choi, Woojong Yoo, Sangchul Won

Combining Motion Capture Data with PD Controller For Human-like Animations ........................................................................................................................................................................... 4618
Soo-hwan Kim, Minkyung Kim, Minje Park

Hybrid Artificial Intelligent Control for Speed Control of Induction motor ........................................................................................................................................................................... 4622
Jae-Sub Ko, Jung-Sik Choi, Dong-Hwa Chung

Maximum Torque Control of IPMSM Drive with LM-FNN Controller ........................................................................................................................................................................... 4628
Jae-Sub Ko, Jung-Sik Choi, Dong-Hwa Chung

Efficiency Optimization Control of SynRM Drive ........................................................................................................................................................................... 4634
Jung-Sik Choi, Jae-Sub Ko, Dong-Hwa Chung

xlvii
# Table of Contents

Sliding Mode Driving Strategy for Four-switch Three-phase Brushless DC Motor .................................................. 4640  
Qiang Fu, Hui Lin

Preliminary Study on the functional reproduction of an Artificial Myocardium using Covalent Shape Memory Alloy Fibre Based on Control Engineering ................................................................. 4646  
Yasuyuki Shiraishi, Tomoyuki Yambe, Kazunatsu Sekine, Yoshifumi Saito, Satoshi Komno, Shin-ichi Nitta, Qingtian Wang, Hongjian Liu, Masaru Higa, Daishu Ogawa, Akira Tanaka, Makoto Yoshizawa, Yasuyuki Kakubari, Hidekazu Muro, Fumihiro Sato

Global Optimization by Searching Multiple Equilibrium Points of Gradient Dynamical System .................................. 4650  
Kazuaki Masuda, Kenzo Kuribara

Security Validation of Continuous-Time Chaotic Communication Systems by Error Function Attack ......................... 4656  
Takahiko Irie, Ikuto Kugimiya, Haruo Suemitsu, Takami Matsuo

Reduced Order Dynamics Assignment for State Feedback Control and State Estimation Design by SVD of the Projections ................................................................. 4662  
Fuat Gürelken

Partial state setting of controller for constrained systems .......................................................................................... 4670  
Naoyuki Hara, Akira Koijima

The number of parameters for all stabilizing controllers without coprime factorizability ........................................ 4675  
Kazuyoshi Mori

Safety Strategies for Human-Robot Interaction in Surgical Environment ................................................................. 4681  
Shinsuk Park

Fingerprint Authentication Using Optical Characteristics in a Finger ................................................................. 4686  
Emiko Sano, Takaji Maeda, Takahiro Nakamura, Masahiro Shikai, Koji Sakata, Masahito Matsushita, Koichi Sasakawa

Safety Analysis of Systemic Accidents Triggered by Performance Deviation ................................................................. 4690  
Tetsuo Sawaragi, Yukio Horiguchi, Akihiro Hina

A Discrete-time Receding Horizon Adaptive Disturbance Estimator for an Oxygen Converter Gas Recovery Process .................................................................................................................. 4694  
Shiro Masuda, Akira Fujimori, Hideyuki Nakada, Chikashi Nakazawa, Yoshikazu Fukuyama

Design of a Human Skill-Based Controller Using Data-Driven Control Approach .................................................. 4698  
Shinnosuke Mori, Akihiro Sakaguchi, Toru Yamamoto

Adaptive Steering Control Scheme for Combination Vehicles to Track Target Lane .................................................. 4702  
Qiang Wang, Masahiro Oya, Toshihiro Kobayashi

Continuous-time model identification by using adaptive observer „Estimation of the initial state„ ........................................ 4708  
Kenji Ikeda, Yoshio Mogami, Takao Shimomura

Dual-rate Robust Adaptive Control of a Cart-crane System .................................................................................. 4712  
Satoshi Ohdaira, Ikuro Mizumoto, Ryuichi Kohzawa, Zenta Iwai

A design of adaptive control for systems with input nonlinearity and its experimental evaluations ......................... 4718  
Kazuya Sato, Tomoyuki Ishibe, Kazuhiro Tsuruta

Trajectory Tracking For Boom Cranes Using A Flatness Based Approach ................................................................. 4724  
J. Neupert, A. Hildebrandt, O. Sawodny, K. Schneider

Energy based Swing-up Control for a 3-Link Robot with Passive Last Joint: Design and Analysis ......................... 4729  
Xin Xin, Masahiro Kaneda, Taiga Yamasaki, Jin-Hua She

Output Regulation Problem and Solution for LTV Minimum Phase Systems with Time-varying Exosystem ........... 4735  
Hyungbo Shim, Jaehwa Lee, Jung-Su Kim, Juhoon Back
## Table of Contents

Robust Object Detection based on Radial Reach Filter for Mobile Robots .................................................. 4740  
Naoya Wajima, Satoru Takahashi, Masaya Itoh, Yutaka Satoh, Shun'ichi Kaneko

Formation Control for Mobile Robots in partially known Environments using Mixed Integer Programming and Fuzzy Systems ................................. 4744  
Thomas Kopfstedt, Masakazu Mukai, Masayuki Fujita, Oliver Sawodny

Passivity-based Synchronized Control of Teleoperation with Power Scaling .............................................. 4750  
Hisanozuke Kawada, Toru Namerikawa

Feedback Control of Decoherence in Quantum Mechanical Systems ......................................................... 4756  
Tzyh-Jong Tarn, Narayan Ganesan

EEG signal classification based on PCA and NN .................................................................................................. 4760  
Changmok Oh, Min-Soeng Kim, Ju-Jang Lee

Design of Biped Robot with Heterogeneous Legs for advanced prosthetic knee application .......................... 4764  
Cheoltaek Kim, Ju-Jang Lee, Xinhe Xu

Catheter Insertion Mechanism and Feedback Control using Magnetic Motion Capture Sensor ..................... 4768  
Carlos Tercerol, Seiichi Ikeda, Tomomi Uchiyama, Toshio Fukuda, Fumihito Arai, Yoshinari Ono

Sensor Fusion Based Fuzzy Rules Learning for Humanitarian Mine Detection ............................................. 4772  
Zakarya Zyada, Yasuhiro Kawai, Takayuki Matsuno, Toshio Fukuda

Virtual Plant Design for Future Production Management ............................................................................ 4778  
Hossam A. Gabbar, Kimitoshi Nishiyama, Shingo Ikeda, Teruo Ooto, Kazuhiro Suzuki

Application of Tracking Simulator to Reforming Process ............................................................................. 4783  
Akio Nakabayashi, Geniaro Fukano, Yasushi Onoe, Makoto Nakaya, Teisuya Ohiani