Contents

Keynote
Variable Structure System and Its Applications ....................... 3
Katsuhisa Furuta

Controlling Complex Dynamical Networks ......................... 20
Guanrong Chen

Computational Mechanics
Implement a Modified Viscoplasticity Based on Overstress Model into
Numerical Simulation of the Incremental Sheet Forming Process . . . . 23
Le Van Sy and Pham Thi Minh Hue

CFD Analysis of High Velocity P/V Valve Movement Depending
on Pressure Change ....................................................... 34
Kim Kwang Soo, Jae-Hyun Ko, Heo Seong Gyu, Park Jae-Hyoun,
Kim Jung Hwan, Kim Young-Han, Na Il-Do, and Hwang Dae-Chul

Finite Element Analysis on the Contact Stress of Class
600 Flange Joints ........................................................ 43
Min-Young Lee, Doo-Hyung Jeong, and Byung-Tak Kim

Computer Science
Accelerate SOMA Using Parallel Processing in GPGPU ............. 53
Tran Trong Dao, Nguyen Mau Toan, Vo Hoang Duy, and Ivan Zelinka

Comparison of Swarm and Evolutionary Based Algorithms for the
Stabilization of Chaotic Oscillations ..................................... 63
Roman Senkerik, Ivan Zelinka, Michal Pluhacek, and Adam Viktorin

Robust Optimization for Audio FingerPrint Hierarchy Searching on
Massively Parallel with Multi-GPGPUs Using K-modes and LSH . . . . 74
Toan Nguyen Mau and Yasushi Inoguchi
Control System

μ-Synthesis Robust Control on Tension Adjustment of Towing Rope System ................................................ 87
Anh-Minh D. Tran, Jung-In Yoon, and Young-Bok Kim

High-Bandwidth Tracking Control of Electric Hydrostatic Actuator (EHA) Using an Input Shaping Filter ................. 97
Hyun-ho Kim, Ill-yeong Lee, and Jun-young Huh

A Robust Simplified Backstepping Control Approach for Pump-Controlled Electro-Hydraulic Systems ............... 108
Dang Xuan Ba and Kyoung Kwan Ahn

Modified Model Reference Adaptive Controller for a Nonlinear SISO System with External Disturbance and Input Constraint .......... 118
Van Tu Duong, Trong Hai Nguyen, Tan Tien Nguyen, Jin Woo Lee, and Sang Bong Kim

A Model Reference Adaptive Controller for Belt Conveyors of Induction Conveyor Line in Cross-Belt Sorting System with Input Saturation .................................................. 129
Huy Hung Nguyen, Van Tu Duong, Hyuk Yim, Cuu Ho Van, Hak Kyeong Kim, and Sang Bong Kim

A Combination of Direct and Indirect Types in Modified Model Reference Adaptive Controller for a SISO Uncertain System ......... 140
Van Tu Duong, Huy Hung Nguyen, Sang Kwun Jeong, Thien Phuc Tran, and Sang Bong Kim

Performance of a Modified-Model Reference Adaptive Controller for Belt Conveyors of Induction Conveyor Line in the Presence of Saturated Inputs and Bounded Disturbances ..................... 149
Huy Hung Nguyen, Van Tu Duong, Thanh Luan Bui, Hak Kyeong Kim, Min Saeng Shin, and Sang Bong Kim

Slide Mode Control Design for a Class of Uncertain Dynamic Systems ....................................................... 162
Van Van Huynh and Bach H. Dinh

Energy

A Numerical Analysis on Heat Transfer Between the Air and the Liquid in a Hybrid Solar Collector ............................. 175

Performance Analysis of Brine Chiller Refrigeration Cycles ......................... 184
Jung-In Yoon, Chang-Hyo Son, Kwang-Hwan Choi, Young-Bok Kim, Suk-Ho Jung, and Changuk Moon
Experimental and Numerical Study on the Thermal Performances of Battery Cell and ECU for an E-Bike
You-Ma Bang, Mahesh Suresh Patil, Jae-Hyeong Seo, and Moo-Yeon Lee

Experimental Investigation of Heat Transfer Characteristics of Battery Management System and Electronic Control Unit of Neighborhood Electric Vehicle
Mahesh Suresh Patil, You-Ma Bang, Jae-Hyeong Seo, Dae-Wan Kim, Bum-Dong Cho, and Moo-Yeon Lee

Electric Energy Conversion of Repeated Mechanical Movement at Automatic Doors
Park Won-Hyun, Jeong Jae-Hoon, Lee Dong-Heon, Choi Myoung-Hoon, and Byun Gi-Sig

Dynamic Behavior Analysis of the Mechanical Parts for the Onshore-Type Wave Energy Converter
Min Soo Kim, and Jeong Hyun Sohn

An Effective Design of a Solar Thermal Collection and Storage System Using Molten Tin as Heat Transfer Fluid
Nguyen Dao, Nguyen Bon, Tran Hoang Quang Minh, and Nguyen Quang Dung

Image Processing
Detecting Pulse from Head Motions Using Smartphone Camera
Jean-Pierre Lomaliza and Hanhoon Park

Preliminary Result on Underwater 3-Dimensional Reconstruction Using Imaging Sonar
Yeongjun Lee, Taejin Kim, Jinwoo Choi, Jongdae Jung, and Hyun-Teak Choi

Vision-Based Marker-Less Motion Measurement for Berthing
Yoshiaki Mizuchi, Yuki Kawabata, Youngbok Kim, and Yongwoon Choi

Independent Statistical Descriptor in Face Recognition
Pang Ying Han, Goh Fan Ling, and Ooi Shih Yin

Implement a Computer Mouse Control for Quadriplegic Disability Using Camera
Nguyen Hoai Ngo, Uyen Dinh Nguyen, Nguyen Ngoc Lam, and Chu Ba Long

Measurement of the Fish Body Wound Depth Based on a Depth Map Inpainting Method
Tian Shui Gao, Dong Bo Sheng, Trong Hai Nguyen, Nam Soo Jeong, Hak Kyeong Kim, and Sang Bong Kim
Performance Evaluation of a Stereo-Camera-Based Markerless Distance Measurement System for Vessel Positioning .......................... 300 Yuki Kawabata, Yoshiaki Mizuchi, Youngbog Kim, and Yongwoon Choi

Positional Displacement Measurement of Floating Units Based on Aerial Images for Pontoon Bridges ............................ 309 Yasuhiro Hirono, Yoshiaki Mizuchi, Young-Bok Kim, and Yongwoon Choi

Industrial Automation

Analysis of the Magnetic Characteristics in MFL Type NDT System for Inspecting Gas Pipelines ........................................ 319 Hui Min Kim, Hui Ryong Yoo, and Gwan Soo Park

A Research on Designing and Controlling of an Automatic Loading System Used Inside Containers ............................... 325 Nguyen Duy Anh, Nguyen Xuan Ha, and Nguyen Phung Hung

Introduction to K-water’s Research and Development Strategy for Advanced Water Pipe Network System Inspection, Monitoring, and Assessment Technology ........................................ 335 Bae Cheol-Ho, Kim Jeong-Hyun, Kim Kyoung-Pil, and Dan Koo

Design of Hopper Position for Development of Automatic Mackerel Grader ....................................................... 344 JiWook Kim, MinSeok Yang, ChulWoong Jun, and JeongHyun Sohn

Introduction of In-Line Inspection Technology in KOGAS .......... 351 Jae-Jun Kim, Dae Kwang Kim, Dong-Kyu Kim, Hui-Ryong Yoo, Sung-Ho Cho, and Seong-Ja Koo

Inspection of Unpiggable Natural Gas Pipelines Using In-Pipe Robot ...... 364 Dae-Kwang Kim, Hui-Ryong Yoo, Sung-Ho Cho, Sung-Ja Koo, Dong-Kyu Kim, Jung-Su Yoo, and Yong-Woo Rho

Materials

Improving the Angular Color Uniformity and the Lumen Output for White LED Lamps by Green Ceₐ₀.₆₇ Tb₀.₃₃ MgAl₁₁ O₁₉:Ce,Tb Phosphor ........................................................... 377 Tran Hoang Quang Minh, Nguyen Huu Khanh Nhan, and Nguyen Thi Phuong Thao

Optically-Regulated Current Switching Device Based on Vanadium Dioxide Thin Film Using Near-Infrared Laser Diode ......... 384 Jihoo Kim, Kyongssoo Park, Sungwook Choi, Seul-Lee Lee, Jun Hyeok Jeong, Sun Jae Jeong, Nouaze Joseph Christian, Bong-Jun Kim, and Yong Wook Lee
Multiple Resistance States in Vanadium-Dioxide-Based Memristive Device Using 966 nm Laser Diode .................................................. 390
Jihoon Kim, Kyongsoo Park, Sungwook Choi, Seul-Lee Lee, Jun Hyeok Jeong, Sun Jae Jeong, Nouaze Joseph Christian, Bong-Jun Kim, and Yong Wook Lee

Wavelength-Switchable Erbium-Doped Fiber Ring Laser Based on Inline Switching Filter .................................................. 395
Kyongsoo Park, Sungwook Choi, Jihoon Kim, Seul-Lee Lee, Jun Hyeok Jeong, Sun Jae Jeong, Nouaze Joseph Christian, and Yong Wook Lee

Simulation Study of Void Aggregations in Amorphous ZnO .......... 400
Le The Vinh, Nguyen Doan Quoc Anh, Nguyen Huu Khanh Nhan, Vo Hoang Duy, Nguyen Kieu Tam, Do Vinh Quang, and Nguyen Van Hong

Influence of Green Phosphor Ce$_{0.67}$ Tb$_{0.33}$ MgAl$_{11}$ O$_{19}$:Ce,Tb on the Luminescent Properties and Correlated Color Temperature Deviation of Multi-chip White LEDs ........................................ 409
Nguyen Quoc Bao, Tran Hoang Quang Minh, Do Vinh Quang, Nguyen Doan Quoc Anh, and Nguyen Thi Phuong Thao

Mechanical Engineering

Analysis of Intermediate Die Profile in Multistage Shape Drawing Process Based on Two-Dimensional Electric Field Analysis: Results for Trapezoidal-Shaped Wire ............................. 417
Byung Min Kim, Kyung Hun Lee, Sea June Oh, Se In Ji, and Jong Sung Kim

Similarity-Based Damage Detection Method: Numerical Study ........ 428
Cheon Hong Min, Hyung Woo Kim, Jae Won Oh, Su Gil Cho, Ki Young Sung, Tae Kyeong Yeu, Sup Hong, Suk Min Yoon, and Jin Ho Kim

Prediction of Strain Response in a Linear Beam System Using Frequency Response Function Between Strain and Acceleration .......... 436
Jungyun Kim and Chan-Jung Kim

Review of ISO 1219 for Practical Use of Graphical Symbols and Circuit Diagrams .................................................. 444
Haroon Ahmad Khan and So-Nam Yun

Analysis of Eddy Current Testing Method for Detection of Surface Hardening and Coating on Carbon Steel ..................................... 451
Jong Min Kim, Chan Wool Kwon, Sung-Jin Song, and Hak-Joon Kim
Effects of Major Design Parameters on Three-Stage Electro-Hydraulic Servovalve Performance .............................................. 459
Iwan Istanto, Hyun-ho Kim, and Ill-yeong Lee

Effects of Piston Galleries on the Piston Temperatures of a Diesel Engine ..................................................... 469
Geesoo Lee, Sangwook Han, Hyunchul Kim, and Younsul Yoo

A Method for Measuring the Speed of Sound in a Rigid Pipe ............ 475
Man Gon Kang and Ill Yeong Lee

Study on Inherent Error of Pair Control Methods for Six Axis Manipulator with Hidden Actuators .................. 484
Jin Jang, Byung-Oh Choi, Jong-Won Park, and Hyun-Suk Yu

A Simulation of the Gerotor Motor with Cylinder Displacement Variation ..................................................... 491
Hwang Hun Jeong, Jong-il Yoon, and Kaptae Kim

The Effect of Preheating on Quality of Friction Stir Welding of Aluminum Alloy A5052 ................................. 500
Than Trong Khanh Dat and Tran Thien Phuc

Monitoring of Tooth Passing and Chatter Properties in End-Milling .... 509
Jong-Do Kim, Do-Hun Chin, Kwang-Heui Kim, and Moon-Chul Yoon

A Study on Break-Away Bolt Design for a Marine Safety Break-Away Coupling Based on Elastic Stress Analysis ..................... 520
Baek Gyu Choi, Hee Hak Ahn, Hong Tae Kim, Young Woo Kim, Won Joong Lee, Byung-Tak Kim, and Inpil Kang

Motor Control

Controller Design for MIMO Servo System Using Polynomial Differential Operator – A Solution for Increasing Speed of an Induction Conveyor System .............................................. 529
Trong Hai Nguyen, Dae Hwan Kim, Sea June Oh, Hak Kyeong Kim, and Sang Bong Kim

Adaptive Sliding Mode Controller for Induction Motor ..................... 543
Chau Dong, Pavel Brandstetter, Huu Hau Vo, Thinh Cong Tran, and Duy Hoang Vo

Parameter Adaptation in Machine Model-Based Speed Observers for Sensorless Induction Motor Drive ................ 554
Hau H. Vo, Pavel Brandstetter, Chau S.T. Dong, Thinh C. Tran, Tri Q. Thieu, and Vo Hoang Duy
Contents

PID Speed Controller Optimization Using Online Genetic Algorithm for Induction Motor Drive .................................................. 564
Thinh Cong Tran, Pavel Brandstetter, Vo Hoang Duy, Hau Huu Vo, and Chau Dong

Closed Loop Motion Synchronous Velocity Control for AC Motor Drives – A Solution for Increasing Speed of a Cross-Belt Sorting Conveyor System .................................................. 577
Dae Hwan Kim, Hyun Jong Kim, and Sang Bong Kim

Power System

Modified Bat Algorithm for Combined Economic and Emission Dispatch Problem .................................................. 589
Ly Huu Pham, Thin Huu Ho, Thang Trung Nguyen, and Dieu Ngoc Vo

New Solutions to Modify the Differential Evolution Method for Multi-objective Load Dispatch Problem Considering Quadratic Fuel Cost Function .................................. 598
Bach H. Dinh and Thang T. Nguyen

Robotics

Locomotion Control of a Hexapod Robot Based on Central Pattern Generator Network .................................................. 611
Dong Bo Sheng, Tian Shui Gao, Huy Hung Nguyen, Trong Hai Nguyen, Hak Kyeong Kim, and Sang Bong Kim

Locomotion Control of a Hexapod Robot with Tripod Gait Using Central Pattern Generator Network .................................. 625
Dong Bo Sheng, Trong Hai Nguyen, Huy Hung Nguyen, Hak Kyeong Kim, Bong Huan Jun, and Sang Bong Kim

Laboratory Test of Lifting Pump for Deep Seabed Manganese Nodule .................................................. 641
Tae Kyeong Yeu, Suk Min Yoon, Cheon Hong Min, Ki Young Sung, Jin Ho Kim, and Sup Hong

Distance Control for Pick-up Device System of Pilot Mining Robot .................................................. 652
Suk Min Yoon, Tae Kyeong Yeu, Sup Hong, Hak Kyeong Kim, and Sang Bong Kim

Optimal Control Method for Stable Walking Gait of a UXA-90 Light Robot .................................................. 664
Nhat Dang Khoa Nguyen, Ba Long Chu, Thanh Phuong Nguyen, Hoang Long Phan, and Tan Tien Nguyen

Stable Walking Gait Planning for 3D Biped Robot with Feet Applied for UXA90-Light .................................................. 675
Tri Dung Nguyen, Ba Long Chu, Thien Phuc Tran, Tan Tien Nguyen, and Sang Bong Kim
Mobile Robot Localization and Path Planning in a Picking Robot System Using Kinect Camera in Partially Known Environment 686
Trong Hai Nguyen, Dae Hwan Kim, Choong Hwan Lee, Hak Kyeong Kim, and Sang Bong Kim

Development of Series Elastics Actuators for Physical Rehabilitation Devices 702
Nhat Tan Pham, Van Tien Anh Nguyen, Nhat Dang Khoa Nguyen, Tan Tien Nguyen, and Sang Bong Kim

Active Control for Rock Grinding Works of an Underwater Construction Robot Consisting of Hydraulic Rotary and Linear Actuators 713
Hyogon Kim, Youngho Choi, Jeoungwoo Park, Jung-woo Lee, Jong-geol Kim, Hyojun Lee, Jong-deuk Lee, and Jinho Suh

Measuring Work Efficiency of the Rock-Crushing Operation of the Hydraulic System 723
Jung-Woo Lee, Hyo-Gon Kim, Jung-Woo Park, Young-Ho Choi, and Jin-Ho Suh

Sensors

Development of Hetero-Core Fiber Optic Tip Tactile Sensors for an Artificial Fingertip 731
Hiroshi Yamazaki, Michiko Nishiyama, and Kazuhiro Watanabe

Femtosecond Laser Internal Processing for an Optical Fiber Sensor Inducing Interference of Optical Waveguide 737
Naoki Chinen, Masahiko Shiraishi, Kenji Goya, Atsushi Seki, Shoichi Kubodera, and Kazuhiro Watanabe

Determining Acceleration Factors for a MEMS Type Accelerometer 745
Gi Chun Lee, Hak Yong Eom, Jin Jang, Byung Oh Choi, Jong-Sik Choi, and Jong Cheol Seo

Telecommunication

A Performance Analysis of an AF Two Hops Model in the Energy Harvesting Relay Network 759
Nguyen Dao, Khanh Nhan Nguyen Huu, Tam Nguyen Kieu, Miroslav Voznak, and Nhu Nguyen Hong

Secrecy Performance of Joint Relay and Jammer Selection Methods in Cluster Networks: With and Without Hardware Noises 769
Phu Tran Tin, Tran Trung Duy, Phuong T. Tran, and Miroslav Voznak
A Dynamic Cooperative MAC Protocol for Vehicular Ad-hoc Networks ............................................. 780
Quynh Tu Ngo and Duc Ngoc Minh Dang

A DF Performance Analysis in Half-Duplex and Full-Duplex Relaying Network ............................................ 791
Khanh Nhan Nguyen Huu, Tam Nguyen Kieu, Hung Ha Duy, Long Nguyen Ngoc, Tuan Dao Huy, Thuan Do Dinh, and Miroslav Voznak

Directional Multi-channel MAC for VANETs .................... 803
Duc Ngoc Minh Dang, Quynh Tu Ngo, Hanh Ngoc Dang, Phuong Luu Vo, and Choong Seon Hong

Optimal Design of Cyclic Prefix in MIMO-OFDM System Over Nakagami-m Fading Channel ......................... 813
Van-Cuu Ho, Hoang-Hiep Le, and Thu-Hang Thi Nguyen

An Efficient Multi-channel MAC Protocol for Vehicular Ad Hoc Networks ............................................ 822
VanDung Nguyen and Choong Seon Hong

Design of Low-Power 24 GHz Voltage-Controlled Oscillator .......... 831
Geun-Ho Choi, Habib Rastegar, Myeong-U Sung, Shin-Gon Kim, Murod Kurbanov, Pushpa Chandrasekar, Jae-Hwan Lim, and Jee-Youl Ryu

On the Performance of Energy Harvesting for Decode-and-Forward Full-Duplex Relay Networks in Imperfect CSI Condition ............ 838
Tan N. Nguyen, Phuong T. Tran, Hoang-Sy Nguyen, Thu-Quyen T. Nguyen, and Miroslav Voznak

Vehicle Technology

Vehicle Dynamic Analysis for the Ball-Screw Type Energy Harvesting Damper System ............................................. 853
Seok-san Shin, Bong-soeb Kim, Dong-won Lee, and Seong-jin Kwon

Virtual Prototyping and Performance Analysis of an IVT Equipped Electric Vehicle ............................................ 863
Chan-Jung Kim, Kyuyeong Cho, and Jungyun Kim

System Design of an Unmanned Surface Vehicle for Autonomous Navigation ............................................ 874
Taejin Kim, Jinwoo Choi, Yeongjun Lee, Jongdae Jung, and Hyun-Taek Choi
Vehicle Stability Controller Based on Adaptive Sliding Mode Algorithm with Estimated Vehicle Side-Slip Angle
Anh-Tuan Le

A Model-Based Controller Development for a Series Hydraulic Hybrid Vehicle
Tri-Vien Vu and Chih-Keng Chen

An Improvement of Rule-Based Control Strategy for a Series Hydraulic Hybrid Vehicle
Tri-Vien Vu and Trung-Hieu Vu

Position Recognition for an Autonomous Vehicle Based on Vehicle-to-Led Infrastructure
Jeong Jae-Hoon, Kim Min, and Byun Gi-Sig

Nonlinear Vehicle Stability Analysis
Boc Minh Hung, Sam-Sang You, and Hwan-Seong Kim

Rapid Shortest Path Decision of Unmanned Aerial Vehicles with Kinematic Constraints
Woong Yeol Joe and Yong-Won Hwang

Author Index

880
891
902
913
922
932
947
AETA 2016: Recent Advances in Electrical Engineering and Related Sciences
Theory and Application
Duy, V.H.; Dao, T.T.; Kim, S.B.; Tien, N.T.; Zelinka, I.
(Eds.)
2017, XVI, 950 p. 728 illus., Hardcover
ISBN: 978-3-319-50903-7