Contents

Keynote Addresses

Hardware Acceleration of Modern Data Management ........................................ 3
Kai-Uwe Sattler

Electric Vehicle Development and Low-Carbon Transport in Vietnam ................ 4
Le Anh Tuan

ICERA 2020 Main Track

A Common-Ground Single-Phase Boost Inverter with Suppressed Double-Frequency Ripple for Photovoltaic Applications ............................................. 7
Minh-Duc Ngo, Quynh-Van Nong, Thuy-Ngan Ngo, Hong-Quang Nguyen, Tan-Tai Tran, and Seon-Ju Ahn

A High Step-up DC-DC Converter with Semiconductor Voltage Stress Reduction ..................................................... 13
Hong-Quang Nguyen, Ngoc-Anh Tran, Van-Nghiep Dinh, Vinh-Thuy Nguyen, Minh-Duc Ngo, and Joon-Ho Choi

A Method to Partition Accuracy in Workspace for Robot Arms ....................... 20
Huu-Thang Nguyen, Long Pham Thanh, and Jen-Tzong Jeng

A Novel Method for Shielding Problems with Taking Robust Correction Procedure into Account ........................................... 29
Vuong Dang Quoc and Dinh Bui Minh

A Review on Ultrasonic Stack Modelling .......................................................... 38
Ngo Nhu Khoa, Nguyen Thi Bich Ngoc, and Tran Duc Tai

A Solution to Power Load Distribution Based on Enhancing Swarm Optimization ...................................................... 53
Truong-Giang Ngo, Thi-Thanh Tan Nguyen, Thi-Xuan Huong Nguyen, Trinh-Dong Nguyen, Van-Chieu Do, and Trong-The Nguyen
A Study for Determination of the Pressure Ratio of the V12 Diesel Engine Based on the Heat Flow Density to Cooling Water ................. 64
Kien.Nguyen Trung

A Study of Scissor Lifts Using Parameter Design ......................... 75
Anh-Tuan Dang, Dinh-Ngoc Nguyen, and Dang-Hao Nguyen

A Study on Prediction of Milling Forces .................................... 86
Do Duc Trung, Tran Ngoc Giang, Tran Thi Hong, Bui Thanh Danh,
Vu Van Khoa, Nguyen Dinh Ngoc, Nguyen Thanh Tu, and Vu Ngoc Pi

A Study on Qualitative and Quantitative Characterization of Machining Quality of Aerospace Composite Structures .................. 94
Nguyen Dinh Ngoc and Nguyen Thi Hue

A Study on Prediction of Grinding Surface Roughness ................... 102
Do Duc Trung, Nhu Tung Nguyen, Hoang Tien Dung, Nguyen Van Thien,
Tran Thi Hong, Tran Ngoc Giang, Nguyen Thanh Tu, and Le Xuan Hung

A Vision-Based Measurement and Classification System for Robot Arm Under Controlled Lighting Condition ......................... 112
Quang-Cherng Hsu, Ngoc-Vu Ngo, Thanh-Long Pham,
Quoc-Khanh Duong, and Duc-Vuong Vu

About a Viewpoint of Calculating Spatial Dimensional Tolerance Chains According to Structure Group of a Parallel Robot ........... 120
Thuy Le Thi Thu, Trung Trang Thanh, Huu-Thang Nguyen,
and Long Pham Thanh

Adaptive Algorithm for Servo System Using Linear Electric Motor ... 133
V. E. Kuznetsov, Phan Thanh Chung, Nguyen Thi Ha,
and Nguyen Hoang Ha

Adaptive Sliding Mode Control for a 2-DOF Robot Arm in Case of Actuator Faults ......................................................... 143
Le Ngoc Truc and Nguyen Phung Quang

An Energy-Efficient Combination of Sleeping Schedule and Cognitive Radio in Wireless Sensor Networks Utilizing Compressed Sensing .... 154
Minh T. Nguyen, Thuong T. K. Nguyen, and Keith A. Teague

An Enhancing Grasshopper Optimization for Efficient Feature Selection ................................................................. 161
Trong-The Nguyen, Shi-Jie Jiang, Thi-Kien Dao, Truong-Giang Ngo,
Thi-Thanh-Tan Nguyen, and The-Vinh Do

An Evaluation of B-Spline for Synthesis of Cam Motion with a Large Number of Output Conditions .................................... 173
Nguyen Thi Thanh Nga, Nguyen Van-Sy, Nguyen Thi Bich Ngoc,
and Vu Thi Lien
An Experimental Study on Vibration-Driven Locomotion Systems
Under Different Levels of Isotropic Friction .......................... 181
Ngoc-Tuan La, Quoc-Huy Ngo, Ky-Thanh Ho, and Khac-Tuan Nguyen

Analysis of Milling Chatter Vibration Based on Force Signal
in Time Domain ................................................................. 192
Minh-Quang Tran, Meng-Kun Liu, and Quoc-Viet Tran

Analytical Study of the Power Parameters of Electric Traction Drive
for Modern Vehicles .......................................................... 200
Aleksey Kolbasov, Kirill Karpukhin, Dmitry Sheptunov,
Povalyaev Andrey, Nguyen Khac Tuan, and Nguyen Khac Minh

Automatic Extraction and Welding Feature Recognition
from STEP Data ............................................................... 210
Lan Phung Xuan and Linh Tao Ngoc

Characterization of Gelatin and PVA Nanofibers Fabricated Using
Electrospinning Process ..................................................... 216
Cuong Nguyen Nhu, Nhung Vu Thi, Nam Nguyen Hoang,
Thao Pham Ngoc, Trinh Chu Duc, Van Thanh Dau, and Tung Bui Thanh

Choice of Selection Methods in Genetic Algorithms for Power System
State Estimation ............................................................... 223
Thanh-Son Tran and Thi-Thanh-Hoa Kieu

Collision-Free Path Following of an Autonomous Vehicle Using
NMPC .................................................................................. 232
Ngo-Quoc-Huy Tran, Ionela Prodan, and Nguyen-Duy-Minh Phan

Compare the Efficiency of the Active Filter and Active Rectifier
to Reduce Harmonics and Compensate the Reactive Power
in Frequency Controlled Electric Drive Systems ...................... 242
Le Van Tung, Pham Thanh Long, Ngo Van An, and Bogdan Vasilev

Comparing the Application of Gas Sensor Fabrication
of Nanomaterials ZnO Fabricated by Hydrothermal and Chemical
Vapor Deposition Method ....................................................... 254
Hoang Van Han, Dao Huy Du, and Do Anh Tuan

Convergence Parameters for D-Type Learning Function .......... 262
Cao Thanh Trung, Nguyen Thu Ha, Tran Kim Quyen,
and Nguyen Doan Phuoc

Current Harmonic Eliminations for Seven-Phase Non-sinusoidal
PMSM Drives applying Artificial Neurons ........................... 270
Duc Tan Vu, Ngac Ky Nguyen, Eric Semail, and Thi Thanh Nga Nguyen
Design and Some Experimental Results of the Robust Current Controller of Doubly-Fed Induction Generator in Wind Power Plant with the Backstepping Technique Based Disturbance Observer .......... 280
C. X. Tuyen and N. T. Huong

Design and Some Experimental Results of the U-Type Permanent Magnet Three-Phase Linear Motor Based Position Control System with the Backstepping Technique Based Disturbance Observer .......... 291
C. X. Tuyen and N. T. Huong

Detail Design of IPM Motor for Electric Power Traction Application ......................................................... 303
Bui Minh Dinh and Dang Quoc Vuong

Detecting Common Web Attacks Based on Machine Learning Using Web Log .................................................. 311
Xuan Dau Hoang

Determination of Kinematic Control Parameters of Omnidirectional AGV Robot with Mecanum Wheels Track the Reference Trajectory and Velocity ................................................................. 319
Trinh Thi Khanh Ly, Nguyen Hong Thai, Le Quoc Dzung, and Nguyen Thi Thanh

Development of New Method for Choosing Standard Components Subject to Minimal Cycle Time and Minimal Sum of Purchasing Cost ................................................................. 329
Tan Nguyen Dang and Manh Cuong Nguyen

Dust Emission During Machining of CFRP Composite: A Calculation of the Number and Mass of the Thoracic Particles .......... 341
Dinh Nguyen Ngoc, Thi Nguyen Hue, Bui Van Hung, and Vu Duy Duc

Dynamic Surface Control of the Axial-Flux Permanent Magnet Motor with Speed Sensorless Algorithm ................................................................. 350
Manh Tung Ngo, Quang Dang Pham, Huy Phuong Nguyen, and Tung Lam Nguyen

Edge-Based Object Pose Estimation Using Differential Evolution Algorithm .................................................. 359
Ngoc Linh Tao and Lan Phung Xuan

Effect of Changing Grounding Mode to Reduce Power Loss on Lightning Ground Wire by Induced Current - Northern Vietnam Overhead Power Transmission Line ........................................ 366
Nhat Tung Nguyen and Xuan Phuc Nguyen

Electromagnetic Design of Synchronous Reluctances Motors for Electric Traction Vehicle .................................. 373
Bui Minh Dinh, Do Trong Tan, and Dang Quoc Vuong
Contents

Enhancing Accuracy of Surface Roughness Model Using Box-Cox Transformation in Surface Grinding AISI 5120 Alloy Steels .................. 379
Do Duc Trung, Nguyen Dinh Ngoc, Tran Thi Hong, Bui Thanh Danh, Nguyen Thanh Tu, Tran Ngoc Giang, Nguyen Thi Quoc Dung, and Vu Ngoc Pi

Ensemble of Deep Learning Models for In-Hospital Mortality Prediction ......................................................... 391
Quang H. Nguyen and Quang V. Le

Evaluating the Impact of Demand Response in Planning Micro-grids Considering Uncertainties ........................................ 399
V. V. Thang and N. H. Trung

Evolutionary Tuning of PID Controllers for a Spatial Cable-Driven Parallel Robot .................................................. 411
Sy Nguyen-Van, Diem Thi Thu Thuy, Nga Nguyen Thi Thanh, and Ngoc Nguyen Dinh

Experimental and Numerical Characterization of Mechanical Behavior for the Corrugated Cardboard .................. 425
Duong Pham Tuong Minh, Dao Lien Tien, and Nguyen Quang Hung

Experimental and Numerical Investigations into Evaporation Rates of Some Fuels Utilized in Aviation Gas Turbine Engines ............ 434
Nam V. T. Pham, Kien T. Nguyen, Thin V. Pham, and Phuong X. Pham

Experimental Evaluation of the Performance of Oil-Based Nanofluids in the Grinding of Ti-6Al-4V Alloy ......................... 441
Trung Kien Nguyen, Hung Trong Phi, Got Van Hoang, Tam Ngoc Bui, and Son Hoanh Truong

Fault Diagnosis for the Short-Circuit Fault of the Single-phase Five-Level VIENNA Active Rectifier ......................... 452
Pham Thi Thuy Linh, Nguyen Ngoc Bach, and Doan Van Binh

Feedforward Based Dual Loop PI Controller for 400 Hz Ground Power Unit ...................................................... 460
Son Tran Que, Dich Nguyen Quang, Minh Y. Nguyen, Quy Do Ngoc, and Phu Do Ba

Force-Velocity Relation of Dampers in Horizontal Washing Machines ................................................................. 469
Nguyen Thi Hoa and Ngo Nhu Khoa

Gear Fault Classification Using the Vibration Signal Decomposition and Neural Networks .................................. 478
Nguyen Trong Du and Nguyen Phong Dien
Genetic Algorithm Based Optimization of Cutting Parameters in CO₂ Laser Beam Cutting of Cow Leather ............................................................ 485 Thangaraj Muthuramalingam, Swaminathan Vasanth, Sanjeev Gupta, and Vu Ngoc Pi

Influences of Cutting Parameters on Surface Roughness During Milling and Development of Roughness Model Using Johnson Transformation ................................................................................................... 491 Do Duc Trung, Nguyen Dinh Ngoc, Tran Thi Hong, Vu Van Khoa, Nguyen Thanh Tu, Tran Ngoc Giang, Nguyen Thi Quoc Dung, and Vu Ngoc Pi

Influence of Random Fiber Length on Macroscopic Properties of Short Fiber Reinforced Composites Due to Microscopic Physical Uncertainty ............................................................................................................ 501 Tien-Dat Hoang, Nhu-Khoa Ngo, Dinh Ngoc-Nguyen, Van-Truong Nguyen, Tuong Minh Duong Pham, Thi Thanh Nga Nguyen, and Viet Dung Luong

Kinematic Analysis of the Class 2 Degree-of-Freedom Planar Parallel Mechanism via GRG2 Algorithm .......................................................................................................................... 508 ThanhTrung Trang, Yueming Hu, Weiguang Li, ThanhLong Pham, TuanAnh Nguyen, and ThiThuThuy Le

Material Removal Rate in Electric Discharge Machining with Aluminum Tool Electrode for Ti-6Al-4V Titanium Alloy .......................................................... 527 Nguyen Huu Phan, Vu Ngoc Pi, Shailesh Shirguppikar, M. S. Patil, Mohsen Asghari Ilani, Le Xuan Hung, T. Muthuramalingam, and Tran Quoc Hung

Mathematical Modelling of Thermoacoustic Generator Systems and Simulation Studies ................................................................................................................................. 534 Trong Tan Do, Duy Tung Le, Phuong Nam Dao, Minh Dinh Bui, and Huy Du Dao

Measurement Setup for Temperature-Dependent Electrical Property of ZnO-Based Thermoelectric Thin Films ........................................................................................ 541 Trính Quang Thong, Nguyễn Anh Minh, Nguyễn Trọng Tinh, Triệu Viết Phuòng, and Đào Huy Du

Modified Q-Learning Algorithm with Lifting Method for Discrete-Time Linear Periodic Systems .......................................................................................................................... 548 Ngoc Trung Dang, Tien Hoang Nguyen, and Phuong Nam Dao

Multi Response Optimization of Dressing Conditions for Surface Grinding SKD11 Steel by HaiDuong Grinding Wheel Using Grey Relational Analysis in Taguchi Method ........................................................................................ 560 Tran Thi Hong, Ngo Ngoc Vu, Nguyen Huu Phan, Tran Ngoc Giang, Nguyen Thanh Tu, Le Xuan Hung, Bui Thanh Danh, and Luu Anh Tung
Multi-objective Optimization of Process Parameters During Electrical Discharge Machining of Hardened 90CrSi Steel by Applying Taguchi Technique with Grey Relational Analysis ........................................ 572
Tran Thi Hong, Nguyen Manh Cuong, Nguyen Dinh Ngoc, Luu Anh Tung, Tran Ngoc Giang, Le Thu Quy, Nguyen Thanh Tu, and Do Thi Tam

Multi-objective Optimization of Surface Roughness and MRR in Surface Grinding of Hardened SKD11 Using Grey-Based Taguchi Method .......................................................... 584
Tran Thi Hong, Do The Vinh, Tran Vinh Hung, Tran Ngoc Giang, Nguyen Thanh Tu, Le Xuan Hung, Bui Thanh Danh, and Luu Anh Tung

Tran Thi Hong, Nguyen Manh Cuong, Tran Ngoc Giang, Nguyen Anh Tuan, Le Thu Quy, Thangaraj Muthuramalingam, Nguyen Thanh Tu, and Do Thi Tam

Numerical Identification of the Mechanical Behaviour of a Fluoroelastomer (FKM) Using Nanoindentation Test ............... 607
Florent Chalon, Julie Pepin, Nathan Le Pennec, Tien-Dung Do, Stéphane Meo, Clémence Fradet, Gaelle Berton, and Florian Lacroix

On Room-Temperature Electrodeposition of Cobalt from a Deep Eutectic Solvent: A Study of Electronucleation and Growth Mechanisms ......................................................... 613
Thao Dao Vu Phuong, Hoang Thi Thanh Thuy, Phuong Dinh Tam, and Tu Le Manh

Optimal Design of Cab’s Isolation System for a Single-Drum Vibratory Roller .......................................................... 619
Le Van Quynh, Nguyen Tien Duy, Nguyen Van Liem, Bui Van Cuong, and Le Xuan Long

Optimization of Cutting Parameters and Nanoparticle Concentration in Hard Milling for Surface Roughness of JIS SKD61 Steel Using Linear Regression and Taguchi Method .................. 628
Thanh-Dat Phan, The-Vinh Do, Thanh-Long Pham, and Huong-Lam Duong

Optimization of Dressing Parameters in Surface Grinding SKD11 Tool Steel by Using Taguchi Method ......................... 636
Tran Thi Hong, Nguyen Thanh Tu, Nguyen Anh Tuan, Tran Ngoc Giang, Nguyen Thi Quoc Dung, Le Xuan Hung, Bui Thanh Danh, and Luu Anh Tung
Optimization of PMEDM Parameters for Improving MMR in Machining 90CrSi Steel - A Taguchi Approach .......................................................... 648
Tran Thi Hong, Do Thi Tam, Do The Vinh, Luu Anh Tung, Le Thu Quy, Thangaraj Muthuramalingam, Vu Ngoc Pi, and Nguyen Manh Cuong

Overshoot and Settling Time Assignment for Second-Order Systems with Time Delay ............................................................. 658
Nam Hoai Nguyen and Phuoc Doan Nguyen

Performance Ratio Analysis Using Experimental Combining Historical Weather Data for Grid-Connected PV Systems .................. 665
Ngo Xuan Cuong, Nguyen Thi Hong, Do Anh Tuan, and Do Nhu Y

Power Control of Andronov-Hopf Oscillator Based Distributed Generation in Grid-Connected Microgrids ...................... 675
Tobias Heins, Trung Tran, David Raisz, and Antonello Monti

Prediction of Cutting Force When Surface Milling Using Face Milling Tool ................................................................. 688
Nguyen Van Thien, Do Duc Trung, Vilaivanh Xaixavang, Tran Thi Hong, Nguyen Thanh Tu, Tran Ngoc Giang, and Le Xuan Hung

Pham Trung Son

Research to Improve the Quality Control for Drive System Tracking Electromechanical Takes into Account Nonlinear Undetermined Application in Industrial Production .................................................. 708
Tran Duc Chuyen, Do Quang Hiep, and Dao Huy Du

Role of Electrolyte Media in the Exfoliation of MoS$_2$ Nanosheets by Electrolysis Plasma-Induced Method .................. 724
Van-Truong Nguyen, Tien-Dat Hoang, Nguyen Thi Kim Ngan, Pham Minh Tan, and Dang Van Thanh

Simulated Annealing Algorithm for Modeling Large Deflection of Flexible Links in Complaint Mechanisms .......................... 729
Nguyen Thi Thanh Nga, Nguyen Thi Bich Ngoc, Nguyen Van-Sy, Nguyen Dinh-Ngoc, Nguyen Quang-Hung, and Hoang Tien Dat

Study on Thermal Convective Gas Gyroscope Based on Corona Discharge Ion Wind and Coriolis Effect ......................... 741
Hang Nguyen Thu, Ngoc Tran Van, Cuong Nguyen Nhu, Van Thanh Dau, An Nguyen Ngoc, Trinh Chu Duc, and Tung Thanh Bui

Studying Electron Transport Coefficients in C$_2$H$_4$-SiH$_4$ Mixtures Using Bolsig+ Program .......................................................... 748
Pham Xuan Hien, Tran Thanh Son, and Do Anh Tuan
## Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesis of Automatic Motion Control Systems of an AUV Based on Fuzzy Logic Methods with Neural Network Setting of Parameters</td>
<td>755</td>
</tr>
<tr>
<td>Van Tuan Pham and Thi Ha Nguyen</td>
<td></td>
</tr>
<tr>
<td>Taguchi-DEAR Based MCDM Approach on Machining Titanium Alloy in AWJM Process</td>
<td>764</td>
</tr>
<tr>
<td>T. Muthuramalingam, Vu Ngoc Pi, and Ammar H. Elsheikh</td>
<td></td>
</tr>
<tr>
<td>The Characterization of Machined Damage of CFRP Composite: Comparison of 2D and 3D Surface Roughness Performance</td>
<td>771</td>
</tr>
<tr>
<td>Nguyen Dinh Ngoc, Duong Pham Tuong Minh, Nguyen Van Sy, Luong Viet Dung, Nguyen Thi Thanh Nga, Nguyen Dang Hao, and Hoang Tien Dat</td>
<td></td>
</tr>
<tr>
<td>The Dimensional Synthesis of the Four-Bar Mechanism with a Symbiotic Organisms Search Algorithm</td>
<td>780</td>
</tr>
<tr>
<td>Sy Nguyen-Van, Ngoc Nguyen-Dinh, P. T. M. Duong, Nguyen Quang Hung, and Thi Thanh Nga Nguyen</td>
<td></td>
</tr>
<tr>
<td>The Effect of Bonnet Skin and Bonnet Reinforcement Thickness on Pedestrian Head Injuries in Collisions</td>
<td>792</td>
</tr>
<tr>
<td>Van-Luc Ngo and Minh Khong</td>
<td></td>
</tr>
<tr>
<td>The Effect of the Wheel Rotation Angle on the Braking Efficiency of the Tractor Semi-trailer on the Wet Roundabout Route</td>
<td>798</td>
</tr>
<tr>
<td>Nguyen Thanh Tung and Vo Van Huong</td>
<td></td>
</tr>
<tr>
<td>The Effect of Welding Speed on the Mechanical Properties of the FSW Cu/Al</td>
<td>805</td>
</tr>
<tr>
<td>Tran Hung Tra, Quach Hoai Nam, Phi Cong Thuyen, Duong Dinh Hao, Truong Thanh Chung, Pham Trong Hop, Ho Huu Huy, Vu Lai Hoang, and Chu Hoang Duc Anh</td>
<td></td>
</tr>
<tr>
<td>The New Method to Control Twin Rotor MIMO System (TRMS)</td>
<td>810</td>
</tr>
<tr>
<td>Lai Khac Lai, Trinh Thuy Ha, Vu Nhu Lan, and Nguyen Tien Duy</td>
<td></td>
</tr>
<tr>
<td>Theoretical and Experimental Study of Sound Transmission Loss Across Finite Clamped Composite Sandwich Plates</td>
<td>820</td>
</tr>
<tr>
<td>Tran Ich Thinh and Pham Ngoc Thanh</td>
<td></td>
</tr>
<tr>
<td>Tool Wear Rate Analysis of Uncoated and AlCrNi Coated Aluminum Electrode in EDM for Ti-6Al-4 V Titanium Alloy</td>
<td>832</td>
</tr>
<tr>
<td>Nguyen Huu Phan, Vu Ngoc Pi, Nguyen Quoc Tuan, Shailesh Shirguppikar, M. S. Patil, Mohsen Asghari Ilani, Le Xuan Hung, T. Muthuramalingam, and Tran Quoc Hung</td>
<td></td>
</tr>
<tr>
<td>Tracking Control of Directed Acyclic Formation via Target Point Localization</td>
<td>839</td>
</tr>
<tr>
<td>Dung Van Vu, Trung Thanh Cao, Minh Hoang Trinh, and Hyo-Sung Ahn</td>
<td></td>
</tr>
</tbody>
</table>
Tracking Control of Rostock Delta Parallel Robot Based on the Dynamic Model .......................... 846
Vu Le Huy, Le Thi Huyen Linh, and Nguyen Dinh Dzung

Trajectory Tracking Control of a Caterpillar Vehicle ............................... 854
Do Trung Hai, Bui Thi Hai Linh, and Tran Ngoc Anh

Truss Optimization Under Frequency Constraints by Using a Combined Differential Evolution and Jaya Algorithm ......................... 861
Sy Nguyen-Van, Thi Thanh Nga Nguyen, Ngoc Nguyen-Dinh, and Qui X. Lieu

Web Tension Observer Based Control for Single-Span Roll to Roll Systems ........................................ 874
Thi Ly Tong, Minh Duc Duong, Danh Huy Nguyen, and Tung Lam Nguyen

Author Index ........................................................................................................ 883