Review of Modern Engineering Solutions for the Industry 2012

Selected, peer reviewed papers from the 2012 International Conference on Mechatronic Systems and Automation Systems (MSAS 2012)

Applied Mechanics and Materials Volume 203

Wuhan, China 21 July 2012

Editors:

Zhenyu Du Bin Liu

ISBN: 978-1-62276-425-9

ISSN: 1660-9336

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by Trans Tech Publications Ltd. All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact Trans Tech Publications Ltd. at the address below.

Trans Tech Publications Ltd. Laubisrutisr 24 CH-8712 Stafa-Zuerich Switzerland

Fax: +41 (44) 922 10 33 Fax: +1 (603) 632-5611

e-mail: sales@ttp.net

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2634

Email: curran@proceedings.com Web: www.proceedings.com

Table of Contents

Preface and Committees

Chapter 1: Mechatronic Devices and Systems

Co-Simulation Technology Development and Application of Electromechanical System H.Y. Zhao and B.Q. Liu	3
The Use of Automobile Electric Control Technology in the New Energy Vehicles Industrialization Process X.R. Gu and B.Q. Liu	7
The Research on Scenario Demonstration Engine of Plan Demonstration in the Detection System J.X. Su, L.J. Guo, H.L. Wang, Y.L. Wu and Y. Zhang	13
Research on Direct Tension Control of Underfeed Winder H. Fang, W. Tang and Y.J. Meng	18
Study on Underwater Terrain Matching Techniques Based on an Improved PMF Algorithm H. Liu, Y.Q. Gao and Y. Zhang	22
Based on the Automatic Control System of Industrial Robots X.F. Ding	27
Moving Object Tracking System Based on Particle Filter on FPGA Design and Implementation J. Song and H.W. Wu	31
Design and Optimization of Missile Three-Loop Autopilot Based on Performance Indicators L.D. Zhao and S.J. Tang	36
An Improved Integral Proportional Guidance Law Based on Optimization and Variable Proportional Factors G.T. Yang, S.J. Tang, J. Guo and D.L. Zhu	41
Fractional order PID Based Control Strategy for the Valve Plant of Hydraulic Transformer S.A. Liu, D.T. Xie, S.Q. Jia, T. Shang, Y.M. Yao and W. Zhao	46
Backstepping Control Design on the Dynamics of the Omni-Directional Mobile Robot Q.Z. Cui, X. Li, X.K. Wang and M. Zhang	51
Design and Implementation of Unmanned Vehicle Simulation System C.X. Chen and Y.H. Mao	57
The Predigest Project of Vehicle-Bone Multimedia Transmission and Control Network Based on FPGA H. Li and Q.Z. Hou	62
	02
Chapter 2: Signal Processing and Measurement	
The Application of Total Least Squares Method in Data Fitting of Speed Radar C. Chen and C.J. Liu	69
Key Points of Human Body Location Based on Single Depth Map H. Hu, B. Li, B.X. Huang and X.L. He	76
Loudspeaker Nonlinear Distortion Signal Instantaneous Frequency Measurement and Analysis Y.T. Wang, H. Wang and Q. Zhang	83
Image Matching Using a Bat Algorithm with Mutation J.W. Zhang and G.G. Wang	88
A New K-Means Clustering Based on Genetic Algorithm C.S. Cheng and Y.M. Shang	94
A Micro Force Measuring System Based on Static Electric Field Theory Y.Y. Qi, L. Song and Y.G. Huang	99

Review of Modern Engineering Solutions for the Industry

Application Research of the Signal Processing Method Based on Db5 Wavelet Transform in Leakage Location of Ship Pipeline Z.B. Peng, Y.C. Liu and X.F. Han	103
The Measurement of Liquid Surface Tension by Optical Technique P. Zhang, D.B. Luo and J.K. Liu	108
A FPGA-Based Long Distance Temperature Measurement System and Control Circuit Y.Z. Li	111
Adaptive Iteration Filter for Suppression of Impulse Noise in Color Images G.H. Wang, D.H. Li and T.Z. Zhao	116
Chapter 3: Control and Automation Systems	
The Key Technology Research of Building Automation System J. Hu and H.W. Hu	125
Investigation on Machinery Control System Based on Fuzzy PID Control Technology K. Luo	130
The Study of PLC Control Technology Application in Motor VVVF System J.C. Liu	135
The Study of IOT Based on RFID W. Ding	139
Polytopic Decomposition of the Linear Parameter-Varying Model Based on HOSVD M.H. Wang, G. Liu and H.Q. Hou	142
Quantization Strategies of RFID Routing in Internet of Things S.S. Yu, X.P. Huang and J. Yang	148
The Comparison of PID Excitation Controller Stabilizing Terminal Voltage Y.P. Qu and G.B. Huang	153
The Study Based on IEC61850 Integrated Substation Automation P.F. Xu	161
The Study of Substation Automation and Control Systems X.F. Ding	167
Based on Computer Substation Monitoring Controlled Video System X.F. Ding	171
Centralized Control Standing Application and Development in the Automation System X.F. Ding	175
Network Automation System Synchronized Clock Real-Time Monitoring System for Research C.M. Xi	180
Design of Remote Measurement and Control System of Seawater Cages Breeding Site Q.L. Zhao, J.M. Hu, J.Y. Liu and L.E. Li	184
Application of Precision Time Protocol on Networked Control Systems C.S. Yang and X.Y. Kong	192
Implementation of Transformation Module of Soft-PLC Based on MDI Application C.J. Chen and L. Li	198
Research on Synthesis Control Technology for Aircraft Electrical System H. Xu and T. Zou	202
Study of the Industrial Wireless Control Network Security Based on Elliptic Curve Cryptography	205
L. Ye and F. Liu Study of Dynamic Management in Digital Harbor Based on Internet of Things	207
C. Hu and J.Y. Du Automation of Power Systems Based on FACTS Controller V.B. Zhang, H. Zay, Y.Y. Yang and N.H. Zhang	212
X.P. Zhang, H. Zou, Y.X. Yang and N.H. Zhang The Simulation and Design Applications of Grinding and Classification Process Control	216
System D.Y. Wang The Frager Pule Pered the PDFM Tengue Central	221
The Fuzzy Rule Based the BDFM Torque Control P. Chen, I.Y. Zhai and Z. Zhu	226

Applied Mechanics and Materials Vol. 203

The Design and Implementation of Information Transmission Module of Fire Alarm System Based on S3C2440 Y.R. Chen, H.J. Huang, X.L. Zheng and F. Wang	231
The Design of Adaptive Noise Control System Based on Neural Network L.J. Cui, H.C. Shang, G. Zhang, Y. Li and Z.X. Zhao	236
Chapter 4: Sensors	
The Research of Load Balancing in Wireless Sensor Network (WSN) F. Pei and J. Zhang	243
Research on Modeling of Sensor Nodes Reliability L.J. Qiu, C.M. Jin and M. Ma	247
Response of Sensitive Device of Piozoresistive Accelerometer to Load J.H. Zhang	252
Grid-Based Clustering Algorithm for Sensing H.Y. Zhang, X. Li, X.K. Wang and M. Zhang	257
The Effects of Phase Retardation of Wave Plate on Cesium Magnetometer Sensitivity Q.M. Li, J.H. Zhang, L. Li, X.J. Zeng and W.M. Sun	263
A Design of Cesium Atomic Magnetometer Based on Circular Dichroism X.J. Zeng, M.S. Hao, Q.M. Li, Q. Liu, J.H. Zhang and W.M. Sun	268
A Kind of Minitype 2D Vector Hydrophone Q.Q. Ge	273
Chapter 5: Material Science and Processing Technology in Manufacturing	
The Effect of Equal-Channel Angular Extrusion to the Cast Aluminum Alloy Materials G.P. Zhang	281
Optimize Study of Pressure Die-Casting Technology for Producing Motor Rotator Y.Q. Yang	286
Computer Simulation of Forming Technology of Thin Aluminum Engine Cylinder Liners Based on LS-DYNA H.W. Liu, H.D. Ren and H.X. Lv	290
Sol-Gel Combustion Synthesis and Properties of Nanocrystalline TbxY1-x Al ₃ (BO ₃)40≤x≤0.2Phosphors P. Zhang, D.B. Luo and J.K. Liu	295
Research on Welded Structure Design Technology D.C. Li	299
Analysis and Control of Micro-Alloy Steel in Continuous Casting Process X. Hong, Z.B. Dong and Z.Z. Yang	304
Chapter 6: Mechanical Engineering and Electrical Power	
Study on Transient Power Quality Disturbance and Detection Method B.Y. Lu	313
A New Structure of the Washing Machine Clutch Research and Development A.X. He and R.C. Li	317
Large Forging Expert System of Diagnosis R.C. Li and A.X. He	321
Study on the Stability and Structural Optimization of Self-Elevating Platform Pile Foundation X.J. Chu	325
Variable Condition Bearing Fault Diagnosis Based on Time-Domain and Artificial Intelligence	
Q.Z. Hu, S.L. Zhang and S. Yang	329

Review of Modern Engineering Solutions for the Industry

Modeling and Simulation on One Unpropelled Vehicle's Dispersal Characteristic of Underwater Based on Ocean Environment X.K. Li, Y. Wei and L. Zheng	334
The Study on Electric Power Equipment Reliability Analysis Using Statistical Method K. Zhang, Y.B. Zheng and H.Y. Yu	340
Renovation for Guiding Trail of Machine Tool by Milling Instead of by Scraping X. Xia	345
CAN-Based Parallel Guidance System for Agricultural Machinery Z.J. Meng, H. Liu and W.Q. Fu	349
Some Reflections on the High Voltage Direct Current Transmission P.F. Xu	355
Study on Energy-Saving Driving Mode during Cornering for Motorized Wheels Driving Vehicle	
H.H. Zhang and G.P. Yang The Study on Power System Protection Algorithms and Fault Detection Using Model-Based Methodology Based on Structural Analysis Z.Z. Duan	360 365
Optimal Decision of Stochastic Controllable New Energy Hybrid Power Generation System J.J. Wu, J. Yi, Y.L. Pan and Y. Wang	370
A Novel Estimation Method on Delta Engine Gas Temperature of a Certain Aero-Engine Based on Flight Data	275
W.Z. Sun, J.L. Qu, Y.P. Zhou, M.J. Liu and F. Gao Impact Analysis of Electric Vehicles Charging/Discharging X.Y. Zhang, H.M. Yang, J.J. Wu and L.C. Xiong	375 380
The Slipping Analyses of the Belt Conveyor between the Belt and the Roller B.Y. Chen and D.S. Zhang	385
Generation Strategy Optimization Based on Peak Regulation Right Transaction Mechanism A.J. Li, H.M. Yang, S.L. Deng and B.P. Liu	390
Attitude Tracking and Location Algorithm of Drill Bit for Underwater Mud-Penetrator K. Yang, T. Ge and X.Y. Wang	395
Comparison Simulation of Friction Heat and Joule Heat in Electromagnetic Railgun L.W. Jin, B. Lei, Z.Y. Li and Q. Zhang	401
An Induction Motor Stator Core Fault Model Based on Stator Negative Sequence Current H.Z. Liu, X.H. Wang, K.Y. Wang and J.X. Feng	406
Comparison of the Hyperbolic Perturbation Method and the Hyperbolic Lindstedt-Poincaré Method for Homoclinic Solutions of Self-Excited Systems Y.Y. Chen, L.W. Yan and W. Zhao	411
Simulation and Research of the EAF Characteristics under Voltage Flicker Using MATLAB	
L. Hu, Z. Huang and B.W. Chen Portable Personal Electric Scooter Optimization Design Research	416
R.Y. Feng, Y. Tang and H.L. Wang Based on One-Dimensional Model to Calculate the Critical Speed	422
J.F. Wang and K. Sun Research in Numerical Simulation of Lager Multi-Scale Water Conveyance Tunnel Based	427
on Mixed Time Integration Method J.J. Zhao and Y.Z. Yang	432
Numerical Simulation of Flow Field of Cavitating Water Jet in Angel Nozzle J.F. Guan, S.S. Deng and W.X. Hua	438
Chapter 7: Other Topics	
The Development of PMD and its Compensation Method F. Wang, Q.H. Sun and H.L. Jiao	445
Design of Motion Control Card on PXI Bus X.K. Wang, Y.B. Niu, L.J. Zhang, F. Feng and P. Wang	449
The Application of Virtual Reality Technology in Gymnastics Movement Simulation M. Feng	454

Applied Mechanics and Materials Vol. 203

Research on Strategies of Pricing and Coordinating in Reverse Supply Chain for Remanufacturing	
Z.F. Zhou	459
The Research of Qubit-Field System Quantum Entanglement under J-C Model Z.P. Chen and J.R. Gao	464
Design and Layout of a High-Performance PWM Control Class D Amplifiers IC Systems R.C. Chen and S.F. Lee	469
Study on Traffic Flow Characteristics and Simulation Based on the VISSIM X. Zhang, B.X. Liu and D.C. Yuan	474
Study on the Maintenance Capacity of "Man-Machine System" Based on Fuzzy Comprehensive Evaluation Y.J. Sun and Y. Qu	479
Design and Application of an New Wireless Adaptive AP X.H. Bai	484
Analyse of the Sub-Munitions Fuze Reliability D.Z. Qin and N.J. Fan	488
Smart Home Service Composition Research Based on Function Decomposition Tree L.L. Xu, J.L. Xu and M.J. Wei	492
A Survey on Additivity Conjecture X.H. Dai and H. Li	497
Design and Simulation of a Kind of Ultrasonic Deicing Acoustic System Y.D. Zhang and L.S. Han	500
Poincare Sphere Method in the Analysis of Fiber Polarization Mode Dispersion F. Wang, L.Z. Feng and K. Wang	504
Research and Practice of Safe Mining Technology in Steeply Inclined Coal Seam under Complicated Geological Conditions X. Ren, R. Zhao and X.L. Chui	509
Simulation of Simplified Three-Dimensional Space Flow Velocity Field in Reservoir on the Condition of Unsteady Flow and its Application S.P. Fan, J.M. Yang, M.Q. Feng and B.M. Zheng	514
Simulation of Drilling Micro-Hole by a Dual CO ₂ Laser Beam Irradiated Sticking Plaster Z.M. Rao, X.B. Xiao and Z.F. He	519