

# **2012 18th International Conference on Automation and Computing**

**(ICAC 2012)**

**Loughborough, United Kingdom  
7 – 8 September 2012**



**IEEE Catalog Number: CFP1260R-PRT  
ISBN: 978-1-4673-1722-1**

# TABLE OF CONTENT

## Key note

*Optimal Control and Energy Efficiency - Integration of Design and Engineering* .....1

## Section I Control & Automation

Estimation of Maximum Allowable Time-Delay Bound for System Stability of Network Controlled Parallel DC/DC Buck Converters <i>Ashraf Khalil, Jihong Wang</i> .....	2
Global Emergency Management System Framework <i>Alfred Ignatius Ajayi, Lili Yang and Malcolm King</i> .....	8
Area and Power optimisation for AES encryption module implementation on FPGA <i>Tuan Anh Pham, Mohammad S. Hasan and Hongnian Yu</i> .....	14
Input-Constrained Adaptive GPC for Simple Industrial Plant <i>Michael Short</i> .....	20
On-chip PVT Compensation Technology for Adaptive Voltage Scaling Control in Computer Power Management Application <i>Minghao Jin, Xiao Fu and Graham McDonald</i> .....	26
A Novel Multi-fold Security Framework for Cognitive Radio Wireless Ad-hoc Networks <i>Munam Ali Shah, Sijing Zhang, Carsten Maple</i> .....	31
A Novel Model-Free Prediction of Power Quality Problems Via DSTATCOM <i>Bala Boyi Bukata and Yun Li</i> .....	37
Fuzzy Supervisory Control Strategies to Minimise Energy Use of Airport Terminal Buildings <i>Abdulhameed Danjuma Mambo, Mahroo Eftekhari &amp; Steffen Thomas</i> .....	43
Analysis and Control of a Single Phase AC Chopper in Series Connection with an Auto-transformer <i>Hao Liu, Jihong Wang</i> .....	49
Dynamic performance of a dual-pressure waste heat recovery system under partial load operation <i>Zixin Sun, Yiping Dai, Hao Liu, Yue Wang, Jihong Wang</i> .....	55
Gain-Constrained Filtering with Probabilistic Sensor Delays and Correlated Noises <i>Jun Hu, Zidong Wang, Bo Shen and Huijun Gao</i> .....	61
The role of IT in Email Preservation and Archiving <i>Lisa Carpenter, Thomas W. Jackson, Graham Matthews, David Thomas, Amanda Spencer</i> .....	67
An Analysis on Decentralized Adaptive MAC Protocols for Cognitive Radio Networks <i>Munam Ali Shah, Sijing Zhang, Carsten Maple</i> .....	73
Neural Predictive Controller of Nonlinear Systems Based on Quasi-ARX Neural Network <i>Imam Sutrisno, Mohammad Abu Jam'iin and Jinglu Hu</i> .....	78
Power Fundamental Frequency Detection Based On Orthometric Average Chirp-Z Transform <i>Guangfu Liu, Zidi Dong, Shuanghua Yang, Xinju Zhao</i> .....	84

A novel health probability for structural health monitoring <i>Xueyan Zhao and Ziqiang Lang</i> .....	90
--	----

## Section II Modeling & Simulation

Modulation Signal Bispectrum Analysis of Motor Current Signals for Stator Fault Diagnosis <i>A. Alwodai, X. Yuan, Y. Shao, F. Gu, A. D. Ball</i> .....	96
Multivariable Simulation on a Homogeneous Charged Microwave Ignition System <i>Lutz-Christoph Schoning and Yun Li</i> .....	102
Research in the development of computational FE software for creep damage mechanics <i>Dezheng Liu, Qiang Xu, Zhongyu Lu, Donglai Xu</i> .....	10
Identification of Critical Bands in DCT Domain Representation for Fingerprint Recognition <i>Yasir Ali Shah, Nasir Ahmad, Muhammad Naeem</i> .....	114
Gait Analysis and Identification <i>Jie Hong, Jinsheng Kang, Michael E. Price</i> .....	118
Synchronization of a linear singularly perturbed complex network with potential application in electric power systems <i>Chenxiao Cai, Zidong Wang and Jun Hu</i> .....	124
Application of computer vision and Support Vector Machines to estimate the content of impurities in olive oil samples <i>P. Cano Marchal, D. Martínez Gila, J. Gámez García and J. Gómez Ortega</i> .....	130
Alignment Method with Application to Gas Chromatography / Mass Spectrometry Screening <i>Jon Hitchcock, Dayou Li, Carsten Maple, Malcolm Keech</i> .....	136
Application of a Reliability Model Generator to a Pressure Tank System <i>K.S. Stockwell and S.J. Dunnott</i> .....	141
Multi-base Buoys Passive Localization Research Based on Simulated Annealing Algorithm <i>Yanni GOU, Yingmin Wang, Qi Wang</i> .....	147
Fault Diagnosis of Rolling Bearings using Multifractal Detrended Fluctuation Analysis and Mahalanobis Distance Criterion <i>J. Lin, Q. Chen, X. Tian, F. Gu</i> .....	152
Overtraced Strokes to Single Line Drawing: Preparation of Sketch for 3D Interpretation <i>Shuxia Wang, Shengfeng Qin, Mantun Gao</i> .....	158
A review of methods for hydrodynamic analysis of helical swimming flagella <i>YUAN Fei, Hongnian Yu, Brian BURROWS</i> .....	164
Fuzzy logic based localisation in Wireless Sensor Networks for disaster environments <i>Shuang Gu, Yong Yue, Carsten Maple, Chengdong Wu</i> .....	172
An Introduction to Bayesian Networks in Dynamic Systems and Control <i>Dr Michael Ashcroft</i> .....	177
Online Sketch Recognition Using Geometric-based Classifiers <i>Shuxia Wang, Guanfeng Wang, Shengfeng Qin</i> .....	183

### **Section III Manufacturing**

The research of surface waviness control technology for 5-axis flank milling <i>Lei Jiang, Guofu Ding, YiSheng Zou, Rong Li, Jian Zhang, Minghua Hu</i> .....	187
OVERVIEW OF VIRTUAL ENTERPRISES IN SUPPLY CHAIN MANAGEMENT <i>Ariunbayar Samdantsoodol, Shuang Cang, Hongnian Yu</i> .....	193
Development of Ultrasound Elliptical Cutting Device and Study on Its Cutting Performance <i>F. Jiao, X. Zhang, L. Zhao, F.B. Li and B. Zhao</i> .....	202
Preliminary analysing of experimental data for the development of high Cr Alloy Creep damage Constitutive Equations <i>Lili An, Qiang Xu, Donglai Xu, Zhongyu Lu</i> .....	207
A New Texture Algorithm for Complex Surface Construction by Fast Smooth Seamless Splicing <i>Yuan Xing, Shengfeng Qin</i> .....	212
Development of A Novel Hybrid Maximum Power Point Tracking Methodology for Photovoltaic Systems <i>Fan Zhang, Kary Thanapalan, Jon Maddy, Alan Guwy</i> .....	218
Comparison of Robust Filtration Techniques in Geometrical Metrology <i>Shan Lou, Wenhan Zeng, Xiangqian Jiang, Paul J. Scott</i> .....	224
Effect of Reverse Gate Bias on Hot-Carrier Reliability in OCB Trench MOSFET for Solar Cell Applications <i>Minghao Jin, Xiao Fu</i> .....	230
Micro-tensile device and test for micro-wire in MEMS <i>Qingshun Bai, Bin He, Yingchun Liang, Kai Cheng</i> .....	234
The Effect of the Variation of Velocity on the Molecular Dynamics Simulation of Nanomachining <i>A.O. Oluwajobi and X. Chen</i> .....	238
The preliminary development of computational software system for creep damage analysis in weldment <i>Feng Tan, Qiang Xu, Zhongyu Lu, Donglai Xu</i> .....	244
Comparative Study of Different Approaches to Solve Batch Process Scheduling and Optimisation Problems <i>Yaqing TAN, Wei HUANG, Yanming SUN, Yong YUE</i> .....	248
Numerical simulation of the component microstructure change through roll forming <i>Z.Q. Hu, K. Cheng, Z.M. Feng</i> .....	254
Custom mandible implant design based on rapid prototyping <i>TAO Qing, SUN Wenlei, SU Na, Jinsheng Kang</i> .....	259
Finite Element Analysis of the Amplitude Transformer in Ultrasonic Vibration System <i>B.Zhao, P.Y. Bian, F. Jiao and Y.G. Zheng</i> .....	263
Simulation Research on FIB Processing: A Comparision between Silicon and Diamond <i>Z. Tong, X.C. Luo, Y.C. Liang, Q.S. Bai, J.N. Sun</i> .....	269
The Diagnosis of a Gearbox Transmission System using Electrical Control Parameters <i>A. Benghozzi, Y. Shao, Z. Shi, F. Gu, A. D. Ball</i> .....	274

## **Section IV Design & Computing**

The Lightweight Design of a Dump Truck Frame based on Dynamic Responses <i>Z. Chen, T. Wang , Z. Zhao, J. Shen, D. Zhen, F. Gu</i> .....	280
Development of an Expert Control Strategy for Controlling Obstacle Crossing of a High-voltage Transmission line Inspection Robot <i>Ji-dai Wang, Ai-qin Sun, Wei Su, Jihong Wang, Hao Liu</i> .....	285
A sensor fusion-based classification system for thermoplastic recycling <i>S. Satorres Martínez, J.M. López Paniza,M. Cobo Ramírez, J. Gómez Ortega, J. Gámez García</i> .....	290
A Framework for Massive Data Transmission in a Remote Real-Time Health Monitoring System <i>Surong Chen, Xiaohui Zhu, Sijing Zhang, Jiehua Wang</i> .....	296
Crowdsourcing Based Product Innovation Design Service Model for Small- and Medium-Sized Enterprises <i>Chunyan Xu, Shengfeng Qin, Zuoping Xiao</i> .....	301
Optimal Sensor Selection for Wind Turbine Condition Monitoring Using Multivariate Principal Component Analysis Approach <i>Yifei Wang, Xiandong Ma, Joyce Malcolm</i> .....	306
A New Apparel Design and Online Shopping Framework for Mass Customization and Best Fit <i>Congying Guan, Shuxia Wang, Shengfeng Qin</i> .....	313
TESPAR Feature Based Isolated Word Speaker Recognition System <i>Munaza Sher, Nasir Ahmad, Madiha Sher</i> .....	318
Study on High-speed Train CAD-CAE Integration Modeling Technology Based on the Multi-level Assembly Models <i>Rong Li, Yi-sheng Zou, Jian Zhang, Pengfei Zhu, Guofu Ding</i> .....	322
Model development of a solar system combined with heat pump <i>Muhammad Waseem Ahmad, Dr. Mahroo Eftekhari, Dr. Thomas Steffen</i> .....	327
The Development of Isolated Words Pashto Automatic Speech Recognition System <i>Irfan Ahmed, Nasir Ahmad, Hazrat Ali, Gulzar Ahmad</i> .....	333
A new sketch partitioning and analysis techniques <i>H W. Tian, S F Qin</i> .....	337
Hyperspectral imaging for determination of some quality parameters for olive oil <i>D. Martínez Gila, P. Cano Marchal, J. Gámez García, J. Gómez Ortega</i> .....	342
Pashto Spoken Digits Database for the Automatic Speech Recognition Research <i>Arbab Waseem Abbas, Nasir Ahmad, Hazrat Ali</i> .....	348
Emotion Recognition – Theory or Practicality <i>Michael Hurst, Thomas W Jackson &amp; Mashuda Glencross</i> .....	352
Building an electric model vehicle with obstacle avoidance system <i>Andrei Fenesan, Owen Mcaree, Wen-Hua Chen, Teodor Pana, Tom Bamber</i> .....	358