

IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT

A PUBLICATION OF THE IEEE INSTRUMENTATION AND MEASUREMENT SOCIETY



MAY 2016

VOLUME 65

NUMBER 5

IEIMAO

(ISSN 0018-9456)

GUEST EDITORIAL

Special Issue on the 2015 IEEE International Instrumentation and Measurement Technology Conference	S. Shirmohammadi, P. Daponte, and W. Van Moer	958
--	---	-----

A/D and D/A Conversion, Analog and Digital Instrumentation

An Easy-to-Interface CDC With an Efficient Automatic Calibration	V. Sreenath and B. George	960
--	---------------------------	-----

Analog and Digital Data, Image and Signal Processing

FFT-Based Spectrum Analysis in the Case of Data Loss	L. Stjbert and G. Orosz	968
Feature Identification With Compressive Measurements for Machine Fault Diagnosis	Z. Du, X. Chen, H. Zhang, H. Miao, Y. Guo, and B. Yang	977

Instrumentation for Measurement of Electric Power Systems, Energy Metering, Electric Power Quality

Uncertainty of Voltage Profile in PMU-Based Distribution System State Estimation	C. Muscas, M. Pau, P. A. Pegoraro, and S. Sulis	988
LV Measurement Device Placement for Load Flow Analysis in MV Smart Grids	A. Cataliotti, V. Cosentino, D. Di Cara, and G. Tinè	999
Combining Electrical and Pressure Measurements for Early Flooding Detection in a PEM Fuel Cell	G. Dotelli, R. Ferrero, P. Gallo Stampino, S. Latorrata, and S. Toscani	1007

Uncertainty Analysis, Accuracy, Precision and Parameter Estimation

Joint Random-Fuzzy Variables: A Tool for Propagating Uncertainty Through Nonlinear Measurement Functions	A. Ferrero, M. Prioli, and S. Salicone	1015
Benchmark Test Distributions for Expanded Uncertainty Evaluation Algorithms	A. Rajan, Y. C. Kuang, M. P.-L. Ooi, and S. N. Demidenko	1022

Imaging Techniques and Instrumentation

Investigation of Different Plant Root Exit Point Vector Search Algorithms in Organic Farming	F. J. Knoll, T. Holtorf, and S. Hussmann	1035
A New Dual-Modality ECT/ERT Technique Based on C ⁴ D Principle	H. Ji, W. Tan, Z. Gui, B. Wang, Z. Huang, H. Li, and G. Wu	1042

(Contents Continued on Page 957)

Measurement of Materials and Applications		
Measurement System for Evaluating Dielectric Permittivity of Granular Materials in the 1.7–2.6-GHz Band	E. Piuzzi, G. Cannazza, A. Cataldo, S. Chicarella, E. De Benedetto, F. Frezza, S. Pisa, S. Prontera, and F. Timpani	1051
Medical and Biomedical Instrumentation and Applications		
An Optical Technique for Real-Time Monitoring of Hemolysis During Hemodialysis	S. Cattini and L. Rovati	1060
Experimental Characterization of a Wireless Personal Sensor Node for the Dosimetry During Interventional Radiology Procedures	D. Magalotti, P. Placidi, M. Paolucci, A. Scorzoni, and L. Servoli	1070
Measurement Techniques		
Operational Measurement of Stationary Characteristics and Positions of Shrouded Steam Turbine Blades	P. Procházka and F. Vaněk	1079
A System for Controllable Magnetic Measurements of Hysteresis and Barkhausen Noise	A. Stupakov, O. Perevertov, and V. Zablotskii	1087
Measuring Oil–Water Two-Phase Flow Velocity With Continuous-Wave Ultrasound Doppler Sensor and Drift-Flux Model	X. Dong, C. Tan, Y. Yuan, and F. Dong	1098
Detecting Defects in Photovoltaic Cells and Panels and Evaluating the Impact on Output Performances	C. Schuss, K. Leppänen, K. Remes, J. Saarela, T. Fabritius, B. Eichberger, and T. Rahkonen	1108
Wideband Surface Impedance Measurements in Superconducting Films	E. Silva, N. Pompeo, K. Torokhtii, and S. Sarti	1120
Simultaneous Measurement of Belt Speed and Vibration Through Electrostatic Sensing and Data Fusion	Y. Hu, Y. Yan, L. Wang, X. Qian, and X. Wang	1130
Measurement of Velocity and Concentration Profiles of Pneumatically Conveyed Particles Using an Electrostatic Sensor Array	J. R. Coombes and Y. Yan	1139
Metrology, Standards and Calibration		
Self-Compensating Networks for Four-Terminal-Pair Impedance Definition in Current Comparator Bridges	L. Callegaro, V. D'Elia, J. Kučera, M. Ortolano, F. Pourdanesh, and B. Trinchera	1149
Calibration of AC Clamp Meters	K. Draxler and R. Styblíková	1156
Nondestructive Evaluation and Remote Sensing		
Measurement System With Accelerometer Integrated RFID Tag for Infrastructure Health Monitoring	D. Jayawardana, S. Kharkovsky, R. Liyanapathirana, and X. Zhu	1163
Determining the Electromagnetic Polarizability Tensors of Metal Objects During In-Line Scanning	Y. Zhao, W. Yin, C. Ktistis, D. Butterworth, and A. J. Peyton	1172
Evaluation of Subsurface Defects Using Diffusion of Motion-Induced Eddy Currents	T. J. Rocha, H. G. Ramos, A. L. Ribeiro, and D. J. Pasadas	1182
Optical Instrumentation, Measurement and Systems		
Probabilistic Absolute Position Sensor Based on Objective Laser Speckles	R. Paris, M. Melik-Merkumians, and G. Schitter	1188
Automated Robust Metric Calibration Algorithm for Multifocus Plenoptic Cameras	C. Heinze, S. Spyropoulos, S. Hussmann, and C. Perwass	1197
RF, Microwave, Millimeter Wave and Tera-Hertz		
Low-Cost Instrument for Whispering Gallery Mode Thermometry up to 19 GHz	S. Corbellini, C. Ramella, M. Pirola, V. C. Fericola, and A. Cappella	1206
Criteria for Automated Estimation of Time of Flight in TDR Analysis	N. Giaquinto, G. M. D'Aucelli, E. De Benedetto, G. Cannazza, A. Cataldo, E. Piuzzi, and A. Masciullo	1215
A Methodology to Measure Input Power and Effective Area for Characterization of Direct THz Detectors	M. Ali, M. Perenzoni, and D. Stoppa	1225
An Experimental System for Tightly Coupled Integration of GPS and AC Magnetic Positioning	G. De Angelis, A. De Angelis, V. Pasku, A. Moschitta, and P. Carbone	1232
Sensors, Sensor Fusion and Transducers		
A Low-Cost Accelerometer Developed by Inkjet Printing Technology	B. Andò, S. Baglio, C. O. Lombardo, V. Marletta, and A. Pistorio	1242
Identification of Oil–Water Flow Patterns in a Vertical Well Using a Dual-Ring Conductance Probe Array	L. Xu, J. Chen, Z. Cao, W. Zhang, R. Xie, X. Liu, and J. Hu	1249
Signals, Systems and System Identification		
Nonparametric Estimation of Time-Varying Systems Using 2-D Regularization	P. Z. Csüricsia and J. Lataire	1259
Using the Best Linear Approximation With Varying Excitation Signals for Nonlinear System Characterization	A. F. Esfahani, J. Schoukens, and L. Vanbeelen	1271