

Message from the Chairs

AMPS is the first Workshop at an international level, sponsored by the IEEE Instrumentation and Measurement Society, in the field of measurement in power systems. AMPS 2010 is aimed at highlighting measurement issues and challenges in modern electric power networks and at encouraging broad discussion about methodologies and results among participants.

As a matter of fact, the evolution that the power systems are undergoing, well represented by the growing interest towards the concept of Smart Grids, requires new kinds of measurement devices and equipments to replace the present ones in the presumably near future. They must feature better performances in terms of bandwidth, accuracy and reliability, reduced weight and cost, as well as more flexibility in terms of customization, communications, power supply.

This evolution opens a variety of new measurement as well as certification challenges. For instance, starting from the next year, incandescent-filament lamps will no more be available on the market. This will lead to a critical lack of instrumentation, given that present Flickermeters only implement a lamp-eye-brain model based on a 60W incandescent-filament lamp.

Furthermore, test laboratories are experiencing growing difficulties in certifying compliance of modern electronic low-power consumption sensors and non conventional instrumentation for two main reasons: lack of both proper product Standards and suitable test facilities.

The increasing attention to Distributed Generation is also opening a wide variety of issues and challenges in the field of measurements. Some examples are: energy measurements both at the utility and prosumer side, fault location and Power Quality responsibility in HVDC, HV, MV lines, on-line dissipation factor measurements in power transformers and generators, Partial Discharges measurements and location in electric machines, in cables (also in underwater cables) and cable joints. These are some of the fields where measurements play a crucial role.

Last but not least, distributed measurement systems represent the most advanced measurement technique that allows overcoming numerous limitations of traditional stand-alone instrumentation and helps implement those new measuring methods for performing measurements in modern power transmission and distribution networks.

Experts from University as well as Industry are expected to provide their skills for facing such open issues and to cooperate for improving the state of knowledge on these topics and propose solutions, rules and guidelines.

The papers collected in these Proceedings provide a first, qualified answer to some of major modern measurement issues in electric power systems.

We do hope that this first edition of AMPS may represent a contribution to the development of the Measurement Science, and also a contribution to the efficient development of such a critical field as the power systems are, based on the awareness that the experimental data coming from the field feature the required accuracy.

Welcome to AMPS 2010!

General Co-Chairs: Prof. Lorenzo Peretto - University of Bologna - Bologna, Italy
Prof. Carlo Muscas - University of Cagliari - Cagliari, Italy

Technical Program Chair: Prof. Antonello Monti - E.ON Energy Research Center RWTH Aachen University, Germany

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Conference Management

Chris Dyer, *Conference Catalysts, LLC, USA*

Wednesday, September 22

8:30 AM - 9:00 AM *Registration*

9:00 AM – 10:30 AM **Opening session**

Room: 0/16

Chairs: Lorenzo Peretto (University of Bologna, Italy), Carlo Muscas (University of Cagliari, Italy), Antonello Monti (RWTH Aachen University, Germany)

9:00 AM - 9:20 AM Welcome Address

9:20 AM - 9:40 AM Keynote Speaker

Rik W. De Doncker: Challenges ahead in future power grids: an academic perspective

9:40 AM - 10:15 AM Keynote Speaker

H. Touati: Challenges ahead in future power grids: an industry perspective

10:15 AM - 10:30 AM Discussion

10:30 AM - 11:00 AM *Coffee break*

11:00 AM - 12:30 PM **Power system monitoring**

Room: 0/16

Chair: Ferdinanda Ponci (RWTH Aachen University, Germany)

11:00 **Measurement of Synchrophasors under Dynamic Conditions**

Paolo Castello (University of Cagliari, Italy)

Marco Lixia (University of Cagliari, Italy)

Carlo Muscas (University of Cagliari, Italy)

11:30 **Measurement and Remote Monitoring for Virtual Synchronous Generator Design**

Mihaela Albu (Politehnica University of Bucharest, Romania)

Javier Diaz (UfE GmbH, Germany)

Vu Van Thong (3e NV, Belgium)

Ralf Neurohr (Politehnica University of Bucharest, Germany)

Dumitru Federenciuc (Electrica S.A., Romania)

Mihail Popa (Politehnica University of Bucharest, Romania)

Mihai Calin (Politehnica University of Bucharest, Romania)

12:00 **Integration of Existing IEC61850-based SAS within new High-Availability Architectures**

Chiara Maria De Dominicis (University of Brescia, Italy)

Paolo Ferrari (University of Brescia, Italy)

Alessandra Flammini (University of Brescia, Italy)

Stefano Rinaldi (University of Brescia, Italy)

Matteo Quarantelli (SELTA S.p.A, Italy)

12:30 PM - 2:30 PM *Luncheon*

2:30 PM - 4:00 PM

Current transducers

Room: 0/16

Chair: Lorenzo Peretto (University of Bologna, Italy)

2:30

Error balance method for air core current transformer with separate coils

Du Feng (,Siemens Ltd., China)

Chen Weigang (Siemens Ltd., China)

Zhuo Yue (Siemens Ltd., China)

Michael Anheuser (Siemens AG, Germany)

3:00

Replacing Current Transformers with Power Current Microsensors Based on Hall ICs without Iron Cores

Nanming Chen (National Taiwan University of Science and Technology, Taiwan)

Kun-Long Chen (National Taiwan University of Science and Technology, Taiwan)

Yuan-Pin Tsai (National Taiwan University of Science and Technology, Taiwan)

3:30

A residual current measurement method with a combination of MR and Hall Effect sensors

Wei Yang (Siemens Ltd., China)

Yue Zhuo (Siemens Ltd., China)

Michael Anheuser (Siemens AG, Germany)

4:00 PM - 4:30 PM

Coffee break

4:30 PM - 5:30 PM

State estimation

Room: 0/16

Chair: Mihaela Albu (Politehnica University of Bucharest, Romania)

4:00

State Estimation and Learning of Unknown Branch Current Flows using Decentralized Kalman Filter with Virtual Disturbance Model

Junqi Liu (RWTH Aachen University, Germany)

Andrea Benigni (RWTH Aachen University, Germany)

Dragan Obradovic (Siemens AG, Germany)

Sandra Hirche (Technische Universitaet Muenchen, Germany)

Antonello Monti (RWTH Aachen University, Germany)

4:30

Uncertainty of Power System State Estimates due to Measurements and Network Parameter Uncertainty

Gabriele D'Antona (Politecnico di Milano, Italy)

Thursday, September 23

9:00 AM – 9:15 AM *Short Introduction by Alessandro Ferrero*

9:15 AM - 10:30 AM **Special Session I "Angelo Barbagelata" – General Problems**

Room: 0/16

Chair: Alessandro Ferrero (Politecnico di Milano, Italy)

9:15 **The IEEE Standard 1459: What and Why?**
Jacques L. Willems (Ghent University, Belgium)

10:00 **The Effects of Integration Intervals on Recursive RMS and Powers Measurement in the Presence of Non-Sinusoidal Conditions**
Roberto Langella (Second University of Naples, Italy)
Alfredo Testa (Second University of Naples, Italy)

10:30 AM - 11:00 AM *Coffee break*

11:00 AM - 12:30 PM - **Special Session II "Angelo Barbagelata" – Harmonic Source Identification**

Room: 0/16

Chair: Paolo Tenti (University of Padova, Italy)

11:00 **Harmonic sources detection in power systems via nonactive power measurements according to IEEE Std. 1459-2010: theoretical approach and experimental results**
Antonio Cataliotti (Università di Palermo, Italy)
Valentina Cosentino (Università di Palermo, Italy)

11:30 **Harmonic Source Estimation in Distribution Systems**
Gabriele D'Antona (Politecnico di Milano, Italy)
Carlo Muscas (University of Cagliari, Italy)
Paolo Attilio Pegoraro (University of Cagliari, Italy)
Sara Sulis (University of Cagliari, Italy)

12:00 **A fuzzy, metrology-sound approach for the identification of the sources injecting periodic disturbances in electric networks**
Alessandro Ferrero (Politecnico di Milano, Italy)
Marco Prioli (Politecnico di Milano, Italy)
Simona Salicone (Politecnico di Milano, Italy)

12:30 PM - 2:30 PM *Luncheon*

2:30 PM - 3:30 PM -

Special Session III "Angelo Barbagelata" – Measurement and metering issues

Room: 0/16

Chair: *Carlo Muscas (University of Cagliari, Italy)*

2:30 Measurement of voltage distortion in the frequency range 2 – 9 kHz

Julio Barros (University of Cantabria, Spain)

M. de Apráiz (University of Cantabria, Spain)

R.I. Diego (University of Cantabria, Spain)

3:00 Accountability and Revenue Metering in Smart Micro-Grids

Paolo Tenti (University of Padova, Italy)

Helmo K. Morales Paredes (University of Campinas, Brazil)

Fernando P. Marafão (University Estadual Paulista, Brazil)

Paolo Mattavelli (Virginia Tech, USA)

3:30 PM - 4:00 PM

Coffee break

4:00 PM - 5:30 PM

Panel Session: Open issues in power system measurements

Room: 0/16

Chairs: *Lorenzo Peretto (University of Bologna, Italy), Mihaela Albu (Politehnica University of Bucharest, Romania)*

8:00 PM - 10:00 PM

Banquet

Room: *Ratskeller am Markt Restaurant - Aachen*

Friday, September 24

9:00 AM - 10:30 AM

Measurement methods

Room: 0/16

Chair: Antonello Monti (RWTH Aachen University, Germany)

9:00

On-line assessment of moisture in a power transformer

M. K. Ilampooran (Indian Institute of Technology, , India)

Venkatraman Jayashankar (Indian Institute of Technology Madras, India)

V. Jagadeesh Kumar (Indian Institute of Technology Madras, India)

N. Madhu Mohan (Indian Institute of Technology Madras, India)

9:30

Online assessment of winding deformation based on optimised excitation

Srungavarapu Gopalakrishna (IIT Madras, India)

Venkatraman Jayashankar (Indian Institute of Technology Madras, India)

V. Jagadeesh Kumar (Indian Institute of Technology Madras, India)

N. Madhu Mohan (Indian Institute of Technology Madras, India)

10:00

New Basis for the Development of the next-generation Flickermeters

Maria Gabriella Masi (University of Bologna, Italy)

Lorenzo Peretto (University of Bologna, Italy)

Roberto Tinarelli (University of Bologna, Italy)

10:30 AM - 11:00 AM

Coffee break

11:00 AM - 12:00 PM

Power electronics

Room: 0/16

Chair: Julio Barros (University of Cantabria, Spain)

11:00

Dynamic Characterization of Power Converters: Methods and Actuators

Marco Riva (Università degli Studi di Milano, Italy)

Federico Belloni (Università degli Studi di Milano, Italy)

Davide Della Giustina (Università degli Studi di Milano, Italy)

11:30

Design of Smart MVDC Power Grid Protection

Huimin Li (University of South Carolina, USA)

Weilin Li (RWTH Aachen University, Germany)

Min Luo ((RWTH Aachen University, Germany)

Antonello Monti (RWTH Aachen University, Germany)

Ferdinanda Ponci (RWTH Aachen University, Germany)

12:00 PM - 1:00 PM

Open discussion and Closing session

Room: 0/16

Chair: Antonello Monti (RWTH Aachen University, Germany)