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NOVELTIES IN ELECTRICAL MEASUREMENTS AND INSTRUMENTATION IN THE WAKE OF IMEKO TC4 & TC 19 SYMPOSIA AND ADC WORKSHOP IN IASI, ROMANIA, SEPTEMBER 2007

From 18 to 22 September 2007, at the Technical University “Gh. Asachi” of Iasi, Romania, there took place undoubtedly important scientific events, held under the auspices of the International Measurement Confederation. This year, the joint 15th IMEKO TC4 and 1st IMEKO TC19 Symposia have been organized together, focusing on measurement and instrumentation for both areas – electrical quantities and environmental monitoring, respectively.

The objectives of the IMEKO TC4 concern electrical measurements in the broad sense, i.e. including both LF and HF measurements, which are of vital importance in various fields of science and technology. Progress in the domain of electrical measurement science and related instrumentation is very fast. It offers continually new possibilities in accuracy and speed of measurement.

Traditionally, the IMEKO TC 4 Symposia were integrated with and supported by the International Workshops on ADC Modelling and Testing. This year, the 12th ADC Workshop was held in Iasi as a parallel event to the IMEKO Symposia. Moreover, one more interesting metrological event associated with previously mentioned symposia and workshop was organized, i.e. the 3rd Technical Meeting on Remote Instrumentation in Next-Generation Grids.

Among the honourable quest of the symposia events there were present the representatives of the Technical University “Gh. Asachi” of Iasi, the National Metrological Organization and also distinguished IMEKO representatives: prof. Antonio Cruz Serra – IMEKO President, prof. Leo Van Biesen – former IMEKO President, prof. Pasquale Daponte – IMEKO TC4 Chairman, prof. Mario Savino – IMEKO TC4 Honorary Chairman, prof. Milos Sedlacek – former IMEKO TC4 Chairman and prof. Pedro Silva Girao – IMEKO TC 19 Chairman. All scientific and social symposia and workshop events were excellently organized and conducted under the leadership of the

Symposia Chairman prof. Mihai Cretu and National Organizing Committee Chairman, prof. Alexandru Salceanu.

The National Organizing Committee was pleased to receive 166 papers. After the reviewing process, 151 papers were selected for presentation, of which 66 in oral style and 85 in poster style. Comparing these data with previously organized IMEKO TC4 events it is worth to mention, that presented numbers are comparable or above average corresponding to past symposia and workshops. On the other hand, the 15th IMEKO TC4 Symposium and the 12th Workshop on ADC Modeling and Testing were joint with the 1st IMEKO TC19 Symposium, so a number of submissions was additionally increased.

Symposia and workshop programme consisted of an opening ceremony and plenary lecture, 17 working sections under the TC4 topics, 5 working sections under the TC19 topics, a special GRID session, poster session and closing session. Working sessions were conducted in parallel, usually in two streams. The symposia and workshop programme have included topics based on previous IMEKO TC4 tradition and experience as well as on current proposals submitted by the IMEKO TC 19 authorities.

The variety of submitted papers reflects well how broad is the thematic area constituting the subjects of interest in the field of electrical measurements and instrumentation.

Through the motto of IMEKO TC4 Symposium “Novelties in Electrical Measurements and Instrumentation” and the subject matter of the symposium papers, the following issues should be emphasized: new trends in the development of electrical quantities metrology, new tools of study in the measured processes, objects and signals as well as new areas for the application of metrology of electrical quantities.

Taking into account the main tendencies observed during those IMEKO events, it should be emphasized very strongly, that the DSP technology is a dominating trend in measurement and instrumentation development. Observed progress in DSP technology covers not only hardware development, but also more and more sophisticated software application in metrology of electrical quantities supported by software measurements. This technology is generally accepted in such areas as *Automated Test and Measurement Systems* (15 papers accepted plus 4 papers devoted to *Remote Instrumentation in Next – Generation Grids*), *Power & Energy Measurements and Power Quality Assessment* (14), *Digital & Mixed Signal Processing and Waveform Analysis & Measurement* (9). Development of new technologies would not be possible without ADC intensive research and resulting from it a remarkably large number of submissions (23) for the present ADC Workshop oriented to such topics as *Σ - Δ ADC for general application, ADC testing, ADC/ADC modelling and ADC standardization*.

The second observed tendency was a quite a significant number of papers addressed to *Microwave and Milimetre Wave Measurements* (11) deal with such issues as radio-frequency and microwave measurements, communication networks, wireless measurement transmission performance, EMC tests and properties or VDSL transmission problems. Summing up, this trend is mainly provoked by telecommunication networks

development and electromagnetic compatibility importance in many fields of interest. It is worth to mention, that the described tendency was very closely related to the theme of the plenary paper presented by prof. Christos Christopolus titled *The role of simulations in support of measurements at high - frequencies*.

Traditionally, a quite numerous representation of papers concerning *Calibration, Metrology and Standards* (12), supported by the topic *Traceability and International Compatibility of Measurements* (4) was noted. This third tendency is rather obvious and easy to explain in the light of measurement accuracy increase and improvement of its assessment, including new definitions and procedures implemented in this area, e.g. uncertainty analysis and consequences resulting from those for laboratory and industrial measurements.

The fourth tendency concerning new areas for the application of electrical quantities metrology may be also appointed. These areas cover *Biomedical Measurements* (11) and *Environmental Monitoring* (18). The latter topic was presented under the 1st IMEKO TC19 umbrella, consisting of such aspects as measuring principles & methods, sensors & actuators, instrumentation & monitoring systems – all related to the field of environmental measurements.

Last but not least, the *E-learning and Education in Measurements and Instrumentation* (11) appears as a very up-to-date topic, in some aspects linked with *Virtual Measurement Systems* (5). In a content-related discussion a fast development of E-learning due to IT tools progress had been underlined. At the same time was formulated the thesis, that virtual technology is a very useful and complementary tool for teaching process, but cannot substitute at all a real-object research.

Evaluation of the level of submitted papers is always a somewhat difficult question, nevertheless it seems that the level of presented papers was comparable with the last symposia. Sixteen papers selected by TC4 Symposium, TC 19 Symposium and ADC Workshop have been recommended for publication in *Computer Standards and Interfaces Journal* and *Journal of IMEKO Measurement*.

Additionally, the Editorial Board of journal *Metrology and Measurements Systems* and Polish representative in the IMEKO TC4 have recommended five papers for publication in extended form in regular issue of this journal.

The next opportunity to present and discuss new research results will be during the 16th IMEKO TC4 Symposium and 13th Workshop on ADC Modelling and Testing, which will take place in Florence, Italy, September 22–24, 2008. Afterwards the next IMEKO XIX World Congress will be organized in 2009 in Lisbon, Portugal.