

Introduction to the ACTA IMEKO issue dedicated to selected papers presented in TC4 at the XXth IMEKO World Congress

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ABSTRACT

This editorial is a brief introduction to the ACTA IMEKO issue dedicated to selected papers presented at the XXth IMEKO World Congress and focused on measurement of electrical quantities (TC4). The congress took place in Busan, Republic of Korea in September 2012.

Keywords: IMEKO World Congress; TC4; Measurement of Electrical Quantities, Busan, Republic of Korea

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1. INTRODUCTION

The XXth IMEKO World Congress (September 9 – 14, 2012) took place in Busan – the second largest metropolis of Republic of Korea, which was the third host city of the World Congress in the Asian region. IMEKO world congresses are important scientific events organised in an every 3-year period where experts in measurement science and technology have a unique possibility to present their latest projects and the results of their research, exchange new ideas and discuss their research intentions. The World Congresses join experts from different fields of measurement science covered by IMEKO Technical Committees (www.imeko.org). IMEKO Congresses are also host to social events where new international friendships have been created that may spread inter-institutional cooperation among recognized experts in the field of measurement across the entire world.

2. IMEKO TC4

IMEKO TC4 is one of the IMEKO technical commissions whose task and goal is to create an international platform for experts in the field of measurement of electrical quantities, emphasizing both theoretical and practical aspects of research in the field. Annual symposia and congresses are organised in member countries by local IMEKO organisations. The country members of IMEKO which have current representatives in the TC4 board are: Belgium, Brazil, Bulgaria, China, Croatia, Czech

Republic, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Korea, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, U.K., and Ukraine. Any new country is cordially welcomed to join IMEKO TC4 activities.

3. THE PAPERS

A special focus at the XXth IMEKO World Congress was placed on the measurement of electrical quantities, which is under the scope of IMEKO Technical Committee 4 (TC4). This editorial is a brief introduction to the ACTA IMEKO issue dedicated to selected papers presented at the World Congress that brought the latest advances on measurement of electrical quantities (TC4).

The papers for the issue were selected by voting of the working group established from TC4 board members who took part at the congress. According to the voting 18 papers were selected and the authors of the papers were invited to prepare extended and improved versions of their papers presented in Busan. After a standard reviewing process eight papers were accepted for publishing in this special issue of ACTA IMEKO.

Modern instrumentation very often requires highly precise and accurate timing signals. A GPS receiver is a typical modern solution of this task. Ogrizović in [1] performed tests of a few receivers in comparison with a rubidium standard. The achieved results proved that a quality GPS receiver is convenient for

common industrial timing. The fluctuations are caused mainly by changes in the quality of the received signals.

The second paper [2] by Gao et al. presents the development, construction and first result achieved from a metrological atomic force microscope, which is intended for precise measurement with uncertainty of 4 nm. The microscope is intended for applications in nanoscience research and industry with the ability of surface topography measurement.

The next paper by Lee et al. [3] introduces a technique for magnetic field measurement based on monitoring the spin precession due to the external field as observing the optical rotation signal. The developed magnetometer achieved a sensitivity of about 120 fT/Hz^{1/2} at 10 Hz.

The paper by Costa da Silva et al. [4] describes an automatic characterization system designed for the measurement of the electric impedance of Giant Magneto-Impedance (GMI) samples. The high speed of measurement attained with the use of this system, designed in the LabVIEW development environment, allows for the rapid determination of the optimal operational point of an eventual GMI magnetometer.

Electric vehicle development is a very topical task and dream for many leading car manufacturers. The paper by Vrazic et al. [5] describes a concept of a mobile lab for electric vehicle systems research and testing based on PLCs and in parallel on a common PC. The lab can be effectively used in the education process at the University of Zagreb.

The next paper in this special issue [6] by Mariscotti is a contribution to railway safety. When a new locomotive is introduced on existing lines it is essential to ensure that the locomotive and the signalling systems are compatible under normal operation and exceptional conditions. The focus of this paper is on the processing circuits and algorithms indicated by the European standards to model the susceptibility of the victim circuits and applied to the recorded pantograph current and its spectrum.

Real-time smart meters network for energy management is the topic of paper [7] by Del Prete et al. The network is composed by several slave smart meters that continuously monitor loads, and an energy generator to make available real-time information, such as power and energy consumption/generation and several power quality parameters, to a specific master device called data aggregator via a CAN bus.

Power quality is one of the highly needed measurements in power electric systems. Masnicki et al. in [8] developed an interface between ADC and DSP based on FPGA for such application. The FPGA collects data from the ADC across a

SPI, processes them, and sends to the DSP via a custom protocol Link Port. The FPGA interface was successfully tested in a complete system for different clock rates.

4. CONCLUSIONS

The special issue offers the choice of the best papers presented at the XXth IMEKO World Congress in Busan in 2012 in the field of measurement of electrical quantities. The section editors of the special issue of ACTA IMEKO would like to thank all authors for their cooperation and improvements of the papers, the reviewers for highly professional reviews, notes and recommendations to the authors, and also to the layout editors of ACTA IMEKO, especially to the father of the journal Paul Regtien for his help and valuable advice.

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