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Editorial

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Dear Reader,

this second issue in 2015 of ACTA IMEKO is particularly rich in content. It contains 14 papers related to the 3 IMEKO events:

IMEKO TC14 - ISMQC - 11th International Symposium on Measurement and Quality Control
11 - 13 September 2013, Cracow and Kielce, POLAND

Joint IMEKO International TC3, TC5 and TC22 Conference 2014
Lagoon Beach Hotel, Cape Town, SOUTH AFRICA
February 3, 2014 – February 5, 2014

13th IMEKO TC10 Workshop on Technical Diagnostics
Advanced measurement tools in technical diagnostics for systems' reliability and safety
Warsaw, Poland, June 26 - 27, 2014

Moreover, it also contains the very first two papers that were submitted directly to ACTA IMEKO without being presented in a prior IMEKO event. The publication of these two papers testifies a major change in the policy of this journal. While it originally started as one of the two journals of IMEKO, publishing invited and extended versions of papers presented at IMEKO conferences and workshops it now also considers papers describing results and advancements in the state-of-the-art of measurement science as a whole, freely submitted by their authors. The Editors believe that this a major advancement in how this journal serves the community of its readers and contributors. At the same time this is an open invitation to all prospective authors to consider this journal as one journal among which to choose when selecting the publication destination of their researches. This journal is and remains an open access journal serving the large community of researchers in metrology.

The first papers in this issue originate from the IMEKO TC14 event held in Cracow and Kielce in 2013. The first contribution is authored by researchers working at the Leibniz University of Hannover in Germany and it proposes a new fringe projection method to detect geometry deviations by reducing, at the same time, measurement duration. The second paper covers again the topic of inspection. It is authored by researchers with the University of Belgrade and with the Metropolitan University in Belgrade and it describes a disciplined process, helping practitioners planning inspection of parts on coordinate measuring machines. The last paper associated to this IMEKO TC14 event is a joint international work between researchers working in Ukraine and Poland and it covers the topic of designing a four electrode conductivity cell for usage as a primary standard in the area of electrolytic conductivity.

The next series of papers is associated to the event held in South Africa last year. Andrea Brüge with the Physikalisch-Technische Bundesanstalt (PTB) in Germany, illustrates the characteristics of a calibration facility for torque wrenches. A detailed representation of all uncertainty sources is presented as well as how they contribute to the final uncertainty budget. The second paper in this series is authored by researchers with the National Metrology Institute of Japan. The authors describe the calibration chain for the national torque standard for hand torque screwdrivers. A thorough analysis of the effect of major uncertainty contributions is made and experimental data are presented. Leonard Klaus and other authors with the German PTB present the following paper on dynamic calibration of torque transducers. This paper describes the issues associated to the modelling of this physical phenomenon and of the identification of the model parameters. The next paper is authored again by researchers with the German PTB. They present a model—based approach to dynamic calibration of force transducers. Modelling and identification of model parameters are discussed in this paper and a large set of experimental results is presented, highlighting the difficulties associated to this task and the open issues to still be addressed.

The paper by Christiaan Veldman with the National Metrology Laboratory of South Africa deals with the transverse sensitivity calibration of accelerometers. Both the measurement principles are introduced and experimental results presented together with the analysis regarding contributing uncertainty sources. The final paper in this series is authored by Christian Schlegel and other colleagues working at the German PTB. It covers the topic of force measurements and of the mechanical influences that are present during sinusoidal force measurements. The experimental arrangement is described and modelling of the transducers using FEM simulations shows the behaviour of the dynamic modes occurring during periodic excitations.

The next 5 papers originate from the IMEKO event held in Warsaw. The first contribution comes from authors with the Instituto de Telecomunicações and Instituto Superior Técnico in Portugal. It deals with non-destructive techniques for testing metallic tubes. The technique used for testing a stainless steel tube using two different magnetic detectors is presented and results discussed to highlight the best solution to solve the test problem. The next paper is authored by Lauryna Šiaudinyte with the Vilnius Gediminas Technical University. It deals with length measurements and with the description of a linear bench for testing total stations. The topic is clearly described and experimental results are presented. The next paper is authored by researchers with the Warsaw University of Technology. It covers the topic of power quality in the context of DC traction supply systems. Accordingly, the effectiveness of ad-hoc designed filters for reducing the AC components is described along with experimental data regarding the harmonics present in the kV range of the considered supply system. The following paper is the result of a joint collaboration between researchers from China and Ukraine. It describes the problem of measuring and correcting the effect of nonlinearities in analog-to-digital converters using multi-resistor dividers. The last paper in this series comes from the Federal Institute for Materials Research and Testing, located in Berlin. It describes two application examples of radio-frequency identification tags in the areas of infrastructure monitoring and of transportation of dangerous goods. This paper shows how innovative applications can still be devised using the RFID technology.

The last two papers in this issues are those directly submitted by their authors. The first one is authored by Daniele Fontanelli et al., with the University of Trento in Italy. It describes a line tracking measurement system for robotic vehicles. The adopted measurement model is illustrated with great detail and experimental results are presented to validate their proposal. The paper concluding this issue is authored by researchers with the University of Naples Federico II. It deals with the 3—parameter sine fitting algorithm. The authors propose two techniques to improve the accuracy of the estimates returned by this algorithm when applied to sinusoidal signals corrupted by noise.

Let me thank all who made this issue possible. As a concluding remark I would like to thank Prof. Francisco Alegria, with the Instituto de Telecomunicações, in Portugal. He contributed to set up this journal and, starting this issue, he ceases his collaboration. The editors are grateful for the time he spent on improving this publication.

Have a fruitful reading of the second issue of ACTA IMEKO in 2015!