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Editorial to selected papers from the 2022 IMEKO TC11&TC24 Joint Conference – 2nd part

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Dear Readers,

This Special Issue collects the extended version of some of the contributions presented at the 2022 IMEKO TC11&TC24 Joint Conference, held in Dubrovnik (Croatia) from the 17th to the 19th of October 2022. The first part of this publication has been included in the second issue of the 12th volume of this Journal, already available online. The 2022 IMEKO TC11&TC24 Joint Conference gathered experts both from industry and academia, covering different topics from the field of 'Measurement in Testing, Inspection and Certification' (IMEKO TC11) and 'Chemical Measurements' (IMEKO TC24). Considering the wide interdisciplinarity of the two Technical Committees, many topics and metrological issues were addressed by the Conference participants. In the following, the published papers will be individually presented.

In the paper "β-risk in proficiency testing in relation to the number of participants" by L.-J. Hollebecq [1] the Monte Carlo method was used to investigate the capacity of Proficiency Testing (PT) schemes to detect laboratories whose biases are out of control. Guidance is proposed to check and improve the efficiency of real PTs.

Some of the problems that arise during image processing are analysed in "Problems of software processing of acquired rotor intended for determining required dimensions" by D. Turinski et. al. [2]. The knowledge gained in this paper will help scientists, and will facilitate software preparation to process photos used to determine the product dimensions.

The primary dilemma, when establishing the calibration protocol of any measurement transducer, is whether the concrete unit is going to be regarded as a standalone instrument, or it will be treated as a part of an integrated measurement system. This issue is addressed in "Trans–conductance amplifier calibration protocol establishment–metrology ambiguities, constraints and measurement uncertainty propagation analysis", by K. Demerdziev et. al. [3]. Here, an originally developed protocol for high current trans-conductance amplifier examination is presented, considering both perspectives for examination.

The paper "Active power measurement uncertainty modelling and propagation analysis in case of harmonically distorted signals" by K. Demerdziev et. al. [4], deals with the challenge of uncertainty determination in the case of harmonics, due to the non-linear dependence between the measured quantities and the single harmonic components' magnitudes and phase shifts. A GUM-based perspective uniting single influence factors is applied and a simplified approach for the correlation coefficients calculation is adopted with experimental model validation.

The paper "Measurement system analysis of a static method for taximeter verification" by B. Sotirov et. al. [5], presents a theoretical study derived from Measurement System Analysis, Root Cause Analysis, and similar taximeter verification methods applied in different European countries.

A new traceability methodology for roughness stylus calibration is being developed in the National Metrology Laboratory of the Portuguese Institute for Quality (IPQ) using a high precision displacement transducer as presented in "A Novel Traceability Route to the SI in Roughness Measurements at IPQ" by F. Saraiva et. al. [6]. A stylus instrument is used to acquire the height values of the scanned points on the surface of the roughness standard. A set of roughness parameters, measured after stylus calibration with different standards artefacts, as defined in ISO 5436-1:2000 has been evaluated. The use of a displacement transducer, as reference, was the studied solution.

The paper "Overestimation of conformity assessment risks in legal requirements of weighing instruments" by O.-J. Purata-Sifuentes et. al. [7], quantifies the effects on the risks for producer and consumer of non-automatic weighing instruments when only the maximum permissible error requirement of the standard

weights used in their conformity assessment is considered during the computation of the measurement uncertainty, against the case when also the standard uncertainty of the weights is involved. The results show that often the producer and consumer risks are both wrongly estimated for the use of only the maximum permissible error location criterion.

The research "Evaluating the uncertainty of a virtual power quality disturbance generator and its use in power quality classifier evaluation" B. Velkovski et. al. [8], presents the metrological evaluation of a proposed virtual power quality (PQ) disturbance generator. It explains the calibration and measurement uncertainty estimation procedures for the RMS voltage and frequency of the generator, presenting the results, and discussing their implications. Additionally, the paper introduces a virtual power quality disturbance classifier for real-time classification of PQ events, and verifies its accuracy through testing, using the proposed PQ disturbance generator.

We hope you will enjoy your reading.

Marija Cundeva-Blajer
Leonardo Iannucci

Guest Editors for the Special Issue

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