**KHARKIV NATIONAL UNIVERSITY OF RADIO ELECTRONICS**
**NATIONAL SCIENTIFIC CENTRE "INSTITUTE OF METROLOGY"**
**KHARKIV ACADEMY OF STANDARDIZATION**
**BULGARIAN ACADEMIC METROLOGICAL COMMUNITY**

**kindly invite you to participate in the 7th International Scientific and Technical Conference**

# "*Metrology, Information-Measuring Technologies and Systems*" (*MIMTS-2020*)

**The conference will be held on February 18-19, 2020, on the basis of Kharkiv National University of Radio Electronics**

**The approximate range of issues that will be discussed:**

- Theoretical foundations of metrology;
- Basic principles of measurement traceability assurance;
- Information-measuring and control systems;
- Modern measuring technologies;
- Quality assurance;
- Training in the field of metrology, standardization, certification, quality assurance.

Before the conference, abstracts will be published in Russian, Ukrainian or English in the amount of 1-2 pages (see the rules for abstracts). The DOI index will be assigned to the abstracts.

The most relevant reports will be subsequently published in the next issues of journal **"Ukrainian Metrological Journal"** (**Web of Science Core Collection**).

Participants of the conference are invited to submit the abstracts (1-2 full pages) in accordance with the attached template by 18.01.2018 to e-mail: **newzip@ukr.net**. Conference working languages: Russian, Ukrainian, English.

## Rules for abstracts of the MIMTS-2020 conference reports

Abstracts are accepted in the amount of 1 or 2 full pages of A4 text, in the MS Word editor **without figures**.

Abstracts are drawn up in accordance with the following requirements:

- font Times New Roman, size 14 pt; margins: left, right, top and bottom – 2 cm; line spacing – single;
- first line – the title of the report in capital letters, center alignment, bold font, size 14 pt. One blank line after the title;
- second line – the name and initials of the authors of the report, center alignment, bold font, size 14 pt;
- third line – the full name of the organization and e-mail, center alignment, non-bold font, italic type.

The main text – after one blank line, justified; indention – 1 cm;

References (font Times New Roman, size 14 pt) – one blank line after the main text.

An example of abstract's drawing-up is given on the next page.

**Contact information: prof. Igor P. Zakharov, newzip@ukr.net,**
**tel.: +380577512584, +380675783981, www.uncertainty.com.ua**

# PROBLEMS OF THE BAYESIAN APPROACH IMPLEMENTATION TO MEASUREMENT UNCERTAINTY EVALUATION

**Zakharov I.P.[1], Neyezhmakov P.I.[2]**
*[1] Kharkiv National University of Radio Electronics,*
*[2]National Scientific Centre "Institute of Metrology"*
*newzip@ukr.net*

More than 20 years have passed since the creation of the Guide to the Expression of Uncertainty in Measurement (GUM) [1]. During this time, many of its shortcomings were identified, which led to the need to develop an approach based on the numerical implementation of the propagation of distributions [2].

The expression for expanded uncertainty $U$ in GUM has the form:

$$U = ku(y), \tag{1}$$

where $k$ is the coverage factor; $u(y)$ is standard uncertainty of the measurand.

A comparison of the expanded uncertainty estimates and those obtained using the approaches described in [1] and [2] shows their numerical difference.

A comparison of the parameter estimates presented in JCGM 100:2008 and JCGM 100:201X (CD) is demonstrated in Table 1 [3].

Table 1

| Parameter | JCGM 100:2008 | JCGM 100:201X (CD) |
|---|---|---|
| $u_A(x_j)$ | $s_j \big/ \sqrt{n_j}$ | $\sqrt{(n_j - 1)/(n_j - 3)} \cdot s_j \big/ \sqrt{n_j}$ |
| $u_B(x_j)$ | Based on a priori information on the PDF of input quantities | |
| $u_j(y)$ | $c_j u(x_j), \quad c_j = \partial y / \partial x_j$ | |
| $U(y)$ | $t_{0,95}(\nu_{eff})u(y)$, $\nu_{eff} = \dfrac{u^4(y)}{\sum_{j=1}^{m} \dfrac{u_j^4(y)}{\nu_j}}$ | $ku(y)$, $k = 4,47$ (for unknown PDF); $k = 2,98$ (for symmetric unimodal PDF) |

## References

1. Guide to the Expression of Uncertainty in Measurement. Geneva: ISO, 1993. 101 p.

2. JCGM 101:2008. Evaluation of measurement data − Supplement 1 to the "Guide to the expression of uncertainty in measurement" − Propagation of distributions using a Monte Carlo method. JCGM, 2008. 88 p.

3. Bich et al. Revision of the "Guide to the Expression of Uncertainty in Measurement". *Metrologia*. 2012, Vol. 49. pp. 702–705.