

EUROLAB supports the EMPIR Special Project “Examples of Measurement Uncertainty Evaluation” (EMUE)

EUROLAB aisbl is proud to support as stakeholder the EMPIR Project “Examples of Measurement Uncertainty Evaluation” (EMUE) and to share with the International Laboratory Community information related with the R&DI developments and links to updated information.



The European Metrology Programme for Innovation and Research (EMPIR) has been developed as an integrated part of Horizon 2020, the EU Framework Programme for Research and Innovation.

More information at: <https://www.euramet.org/research-innovation/research-empir/>



Examples of Measurement Uncertainty Evaluation

Overview

This project is providing a comprehensive set of worked examples illustrating how principles of measurement uncertainty evaluation can support documentary standards and guides. It is promoting uncertainty evaluation according to internationally recognized guides across broad disciplines of measurement. The project is delivering new or improved adaptable examples of and templates for uncertainty evaluation to the Joint Committee for Guides in Metrology (JCGM) as publishers of the internationally acknowledged *Guide to the expression of uncertainty in measurement* (GUM). The project is also providing examples to ten standardization bodies that are specifically related to standards they are developing.

Objectives

The specific objectives are:

- To develop examples of measurement uncertainty evaluations capable of acting as template solutions that end users can use for related problems. Examples will include measurement model construction, application of uncertainty evaluation principles for addressing industrial conformity assessment, and taking correlations into ac-

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count as requested by ISO/REMCO, the ISO committee concerned with reference materials.

- To derive worked examples of uncertainty analyses using the GUM and other methods to assist users to make informed choices on an appropriate uncertainty evaluation method to use. Examples will include an examination of the extent to which the GUM is appropriate for certain applications or whether the Monte Carlo methods of GUM Supplements 1 and 2, or Bayesian methods, have greater efficacy.
- To collaborate with JCGM/WG1 (the chief stakeholder), and the standardization, regulatory and accreditation communities (ISO, IEC, OIML, and ILAC) to ensure that the outputs of the project are aligned with their needs, communicated quickly, and in a form that can readily be incorporated into the JCGM Guides and other documents.

The project will extend current provisions by providing examples in areas that include:

- Calibration where the response and stimulus variables both have uncertainties (quality of life, fluid flow, etc.),
- Testing where repeated observations under the same conditions cannot readily be made because the process destroys the sample (destructive testing),
- Interlaboratory comparisons where full account is to be taken of correlation effects (as arise, for instance, in repeated measured values from the same participating laboratory),
- Tests of conformity to specification and regulation (air quality, doping control, etc.), with consideration of producer's and consumer' risks,
- Comparison of candidate measurement models (environment),
- Image quantification (in molecular radiotherapy and nanoparticle sizing, for example), and
- Metering of utilities (water, electricity, etc.).

More information about the EMUE Project can be found at <http://empir.npl.co.uk/emue/>

Compendium of examples

A compendium containing the examples will be made freely available and include worked examples covering the sectors environment, energy, quality of life, and industry and society. Moreover, examples will relate to the common metrological activities of calibration, testing, comparison, and conformity to regulation and specification. The final version of the compendium will include some 40 worked examples. The current version, containing about 20 examples, is available at

http://empir.npl.co.uk/emue/wp-content/uploads/sites/49/2020/12/Compendium_M27.pdf