

Data Processing and Calculation of Uncertainties in Key Comparisons

A.G.Chunovkina, V.A.Slaev

VNIIM, St.Petersburg

In metrology the concept “equivalence” of standards is a relatively new one, that is why it needs for additional clarification. Traditionally, the role of comparisons of national measurement standards consists in providing an objective basis for mutual recognition of measurement results (in particular, of calibration certificates) and more exactly, in that the validity of the assigned characteristics of accuracy of measurement standards should be reliably confirmed. A procedure for verifying the indicated characteristics consists in comparing the obtained differences between the measurement results via such accuracy characteristics of standards. If the differences are within the declared uncertainties of the standards, this fact indirectly confirms the validity of the last ones.

Analysis of the differences between measurement results is also of interest by itself, e.g. in investigation of standards, in detection and analysis of systematic deviations in case of realizing the units of physical quantities. This, ultimately, leads to improvement of measurement standards and to increase of their accuracy in realization of the units.

Closeness of the obtained results can be explained in some cases by approximately similar systematic biases that occur in realization of the units of physical quantities in national metrology laboratories. It is, therefore, suggested *to interpret the equivalence of measurement standards as the closeness of their systematic errors.*

Hence two problems arise in the course of comparisons, namely: the first problem refers to checking or verifying the assigned accuracy characteristics, and the second one – to evaluating the closeness of systematic errors of standards. If the assigned characteristics have been confirmed in the course of their verification, then, they are the quantitative expression of the CMCs demonstrated by the given NMI in calibrations. These two problems are discussed in the paper.