

LINKING CIPM AND RMO COMPARISONS

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We introduce an overview of three methods used to link a key comparison organized by a Regional Metrology Organization (RMO) and a key comparison organized by a Consultative Committee of the International Committee for Weights and Measures (CIPM): (i) a heuristic (or naive) approach; (ii) weighted least squares (a simplified version of Sutton, 2004); and (iii) a Bayesian common laboratory effects model (Bodnar & Elster, 2018).

These procedures are illustrated in an application to results from CCM.M-K7 (Lee et al., 2017). The expanded uncertainties that are part of the degrees of equivalence (DoEs $\{D[j], U95(D[j])\}$) for the linked comparisons based on (i) and (ii) were evaluated using the Monte Carlo method. Their counterparts based on (iii) were evaluated based on the output of Markov Chain Monte Carlo (MCMC) sampling of the joint Bayesian posterior distribution for the model.

The DoEs produced by the Bayesian procedure have the smallest uncertainties of the three approaches, and also have $D[j]$ values closest to 0 mg. The Bayesian common random effects model can also easily recognize dark uncertainty in one or both comparisons being linked, and takes it into account.

References

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