

Articles Relevant to the Expression of Uncertainty in Measurement

The following citations are for information purposes but are not necessarily endorsed by the members of JCGM/WG 1. This compilation is not meant to be exhaustive.

[1993](#) 1994 1995 [1996](#) [1997](#) [1998](#) [1999](#) [2000](#) [2001](#)
2002 [2003](#) [2004](#) [2005](#) [2006](#) [2007](#)

1993

A Bayesian Theory of Measurement Uncertainty

K. Weise and W. Wöger

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Meas. Sci. Technol., 1993, **4**, No. 1, 1-11.

1996

[Simple Formula for the Propagation of Variances and Covariances](#)

W. Bich

Istituto di Metrologia "G. Colonnetti", Turin, Italy

Metrologia, 1996, **33**, 181-183. [Erratum](#): Metrologia, 1996, **33**, 505.

1997

[Metrological timelines in traceability](#)

C.D. Ehrlich and S.D. Rasberry

Technology Services, National Institute of Standards and Technology, Gaithersburg, USA

Metrologia, 1997, **34**, 503-514.

[A Distribution-Independent Bound on the Level of Confidence in the Result of a Measurement](#)

Tyler W. Estler

National Institute of Standards and Technology, Gaithersburg, USA

J. Res. Natl. Inst. Stand. Technol., 1997, **102**, 587-588.

The Evaluation of Standard Uncertainty in the Presence of Limited Resolution of Indicating Devices

Ignacio H. Lira and Wolfgang Wöger

Pontificia Universidad Católica de Chile, Santiago, Chile; Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Meas. Sci. Technol., 1997, **8**, 441-443.

[Guidelines for Expressing the Uncertainty of Measurement Results Containing Uncorrected Bias](#)

Steven D. Phillips, Keith R. Eberhardt and Brian Parry

National Institute of Standards and Technology, Gaithersburg, USA; Boeing Corporation, Seattle, USA.

J. Res. Natl. Inst. Stand. Technol., 1997, **102**, 577-585.

Uncertainty Treatment in Monte Carlo Simulation

K. Weise and H. Zhang

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

J. Phys. A: Math. Gen., 1997, **30**, 5971-5980.

1998

Assessing Uncertainty in Measurement

Leon Jay Gleser

University of Pittsburgh, Pennsylvania, USA

Statistical Science, 1998, **13**, No. 3, 277-290.

Evaluation of the Uncertainty Associated with a Measurement Result not Corrected for Systematic Effects

Ignacio H. Lira and Wolfgang Wöger

Pontificia Universidad Católica de Chile, Santiago, Chile; Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Meas. Sci. Technol., 1998, **9**, 1010-1011.

The Evaluation of the Uncertainty in Knowing a Directly Measured Quantity

Ignacio H. Lira and Wolfgang Wöger

Pontificia Universidad Católica de Chile, Santiago, Chile; Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Meas. Sci. Technol., 1998, **9**, 1167-1173.

[Least-squares Estimation using Lagrange Multipliers](#)

Lars Nielsen

Danish Institute of Fundamental Metrology, Lyngby, Denmark

Metrologia, 1998, **35**, 115-118. [Erratum](#): Metrologia, 2000, **37**, 183.

[Calculation of Measurement Uncertainty Using Prior Information](#)

S. D. Phillips et al.

National Institute of Standards and Technology, Gaithersburg, USA

J. Res. Natl. Inst. Stand. Technol., 1998, **103**, 625-632.

[Confidence-interval Interpretation of a Measurement Pair for Quantifying a Comparison](#)

Barry M. Wood and Robert J. Douglas

National Research Council of Canada, Ottawa, Canada

Metrologia, 1998, **35**, 187-196. [Erratum](#): Metrologia, 1999, **36**, 245.

1999

[Measurement as Inference: Fundamental Ideas](#)

Tyler W. Estler

Precision Engineering Division, National Institute of Standards and Technology,
Gaithersburg, USA

Annals of the CIRP, Keynote Paper, 1999, **48**, No. 2, 611-632.

[A Bayesian approach to the consumer's and producer's risks in measurement](#)

I. Lira

Metrologia, 1999, **36**, 397-402.

Uncertainty of Measurement and Error Limits in Legal Metrology

W. Schulz and Klaus-Dieter Sommer

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany; Landesamt für
Mess- und Eichwesen Thüringen, Ilmenau, Germany

OIML Bulletin, 1999, **XL**, No. 4, 5-15.

[Comments on the Accuracy of Some Approximate Methods of Evaluation of Expanded Uncertainty](#)

D. Turzeniecka

Technical University of Poznań, Poznań, Poland

Metrologia, 1999, **36**, 113-116.

Quantifying Demonstrated Equivalence

Barry M. Wood and Robert J. Douglas

National Research Council of Canada, Ottawa, Canada

IEEE Transactions on Instrumentation and Measurement, 1999, **48**, No. 2, 162.

2000

[Limitations of the Welch-Satterthwaite Approximation for Measurement Uncertainty Calculations](#)

M. Ballico

CSIRO National Measurement Laboratory, Lindfield, Australia

Metrologia, 2000, **37**, 61-64.

Evaluation of Measurement Uncertainty in the Presence of Combined Random and Analogue-to-digital Conversion Errors

Clemens Elster

Physikalisch-Technische Bundesanstalt, Berlin, Germany

Meas. Sci. Technol., 2000, **11**, 1359-1363.

Cycles of Comparison Measurements, Uncertainties and Efficiencies

Michael Gläser

Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Meas. Sci. Technol., 2000, **11**, 20-24.

Propagation of Errors for Matrix Inversion

M. Lefebvre et al.

Department of Physics and Astronomy, University of Victoria, Victoria, Canada

N.I.M. Phys Res. A, 2000, **451**, 520-528.

[An Approach to Combining Results from Multiple Methods Motivated by the ISO GUM](#)

M. S. Levenson et al.

National Institute of Standards and Technology, Gaithersburg, USA

J. Res. Natl. Inst. Stand. Technol., 2000, **105**, 571-579.

[Curve adjustment by the least-squares method](#)

I. Lira

Metrologia, 2000, **37**, 677-681.

Uncertainty and Traceability in Calibration by Comparison

Emmanouil Mathioulakis and Vassilis Belessiotis
NCSR 'Demokritos', Agia Paraskevi Attikis, Greece
Meas. Sci. Technol., 2000, **11**, 771-775.

[Possible Advantages of a Robust Evaluation of Comparisons](#)

Jörg W. Müller
Bureau International des Poids et Mesures, Sèvres, France
J. Res. Natl. Inst. Stand. Technol., 2000, **105**, 551-555. [Erratum](#): J. Res. Natl. Inst. Stand. Technol., 2000, **105**, 781.

Removing Model and Data Non-Conformity in Measurement Evaluation

K. Weise and W. Wöger
Parkstrasse 11, D-38 179 Schwülper, Germany; Physikalisch-Technische
Bundesanstalt, Braunschweig, Germany
Meas. Sci. Technol., 2000, **11**, 1649-1658.

[The Propagation of Uncertainty on Interpolated Scales, with Examples from Thermometry](#)

D. R. White and P. Saunders
Measurement Standards Laboratory of New Zealand, Industrial Research Ltd, Lower
Hutt, New Zealand
Metrologia, 2000, **37**, 285-293.

Accuracy of Error Propagation Exemplified with Ratios of Random Variables

Peter J. Winzer
Technische Universität Wien, Vienna, Austria
Review of Scientific Instruments, 2000, **71**, No. 3, 1447.

2001

[Does "Welch-Satterthwaite" Make a Good Uncertainty Estimate ?](#)

B. D. Hall and R. Willink
Measurement Standards Laboratory of New Zealand, Lower Hutt, New Zealand;
Applied Mathematics Centre, Industrial Research Ltd, Lower Hutt, New Zealand
Metrologia, 2001, **38**, 9-15.

Evaluation of cycles of comparison measurements by a least-squares method

I. Lira

Measurement Science and Technology, 2001, **12**, 1167-1171.

Bayesian evaluation of the standard uncertainty and coverage probability in a simple measurement model

I. Lira and W. Wöger

Measurement Science and Technology, 2001, **12**, 1172-1179.

[*The Propagation of Uncertainty with Non-Lagrangian Interpolation*](#)

D. R. White

Measurement Standards Laboratory of New Zealand, Industrial Research Ltd, Lower Hutt, New Zealand

Metrologia, 2001, **38**, 63-69.

2003

Uncertainty and efficiency of correlated measurement cycles with periodically varying patterns

M. Gläser

Meas. Sci. Technol., 2003, **14**, 433–438.

Calculating measurement uncertainty for complex-valued quantities

B. D. Hall

Meas. Sci. Technol., 2003, **14**, 368–375.

[*Uncertainty calculation for the ratio of dependent measurements*](#)

J. Hannig, C. M. Wang, H. K. Iyer

Metrologia, 2003, **40(4)**, 177-183.

[*On use of Bayesian statistics to make the Guide to the Expression of Uncertainty in Measurement consistent*](#)

R. Kacker and A. Jones

National Institute of Standards and Technology, Gaithersburg, USA

Metrologia, 2003, **40**, 235-248.

The 'Guide to Expression of Uncertainty in Measurement' Approach for Estimating Uncertainty: An Appraisal

J. Kristiansen

Clin. Chem., 2003, **49(11)**, 1822-1829.

[*Error analysis in the evaluation of measurement uncertainty*](#)

A. M. H. van der Veen and M. G. Cox

Metrologia, 2003, **40(2)**, 42-50.

2004

[*Assigning probability density functions in a context of information shortage*](#)

R. R. Cordero and P. Roth

Metrologia, 2004, **41(4)**, L22-L25.

[*On the propagation of uncertainty in complex-valued quantities*](#)

B. D. Hall

Metrologia, 2004, **41(3)**, 173-177.

Bayesian inference of linear sine-fitting parameters from integrating digital voltmeter data

G. A. Kyriazis and M. L. R. de Campos

Meas. Sci. Technol., 2004, **15**, 337-346.

Erratum: Meas. Sci. Technol., 2004, **15**, 1947.

[*Coverage intervals and statistical coverage intervals*](#)

R. Willink

Metrologia, 2004, **41(3)**, L5-L6.

2005

[*On the best fit of a line to uncertain observation pairs*](#)

A. Balsamo, G. Mana, F. Pennechi

Metrologia, 2005, **42(5)**, 376-382.

[On two methods to evaluate the uncertainty of derivatives calculated from polynomials fitted to experimental data](#)

R. R. Cordero and P. Roth
Metrologia, 2005, **42(1)**, 39-44.

[Revisiting the problem of the evaluation of the uncertainty associated with a single measurement](#)

R. R. Cordero and P. Roth
Metrologia, 2005, **42(2)**, L15-L19.

[A useful reflection](#)

R. J. Douglas, A. G. Steele, B. M. Wood, K. D. Hill
Metrologia, 2005, **42(5)**, L35-L39.

Including correlation effects in an improved spreadsheet calculation of combined standard uncertainties

S. L. R. Ellison
Accred. Qual. Assur., 2005, **10**, 338-343.

[Monte Carlo-based estimation of uncertainty owing to limited resolution of digital instruments](#)

R. B. Frenkel and L. Kirkup
Metrologia, 2005, **42(5)**, L27-L30.

Verification of uncertainty budgets

K. Heydorn and B. Stjernholm Madsen
Accred. Qual. Assur., 2005, **10**, 403-408.

A software package comparison for uncertainty measurement estimation according to GUM

J.M. Jurado and A. Alcazar
Accred. Qual. Assur., 2005, **10**, 373-381.

[High order corrections to the Welch-Satterthwaite formula](#)

Z. Liu
Metrologia, 2005, **42(5)**, 449-457.

[Evaluation of the uncertainty of the degree of equivalence](#)

G. Ratel
Metrologia, 2005, **42(2)**, 140-144.

[Propagation of uncertainties in measurements using generalized inference](#)

C. M. Wang and H. K. Iyer
Metrologia, 2005, **42**, 145–153.

[On higher-order corrections for propagating uncertainties](#)

C. M. Wang and H. K. Iyer
Metrologia, 2005, **42(5)**, 406-410.

[A procedure for the evaluation of measurement uncertainty based on moments](#)

R. Willink
Metrologia, 2005, **42(5)**, 329-343.

2006

[The expression of uncertainty in non-linear parameter estimation](#)

A. Balsamo, G. Mana, F. Pennechi
Metrologia, 2006, **43(5)**, 396-402.

[Non-linear models and best estimates in the GUM](#)

W. Bich, L. Callegaro, F. Pennechi
Metrologia, 2006, **43(4)**, S196-S199.

[Evolution of the 'Guide to the Expression of Uncertainty in Measurement'](#)

W. Bich, M. G. Cox, P. M. Harris
Metrologia, 2006, **43(4)**, S161-S166.

[Extending the discussion on coverage intervals and statistical coverage intervals](#)

L.-A. Chen and H.-N. Hung
Metrologia, 2006, **43(6)**, L43-L44.

[Effect of the resolution on the uncertainty evaluation](#)

R. R. Cordero, G. Seckmeyer, F. Labbe
Metrologia, 2006, **43(6)**, L33-L38.

[The generalized weighted mean of correlated quantities](#)

M.G. Cox, C. Eiø, G. Mana, F. Pennechi
Metrologia, 2006, **43(4)**, S268-S275.

Measurement uncertainty and traceability

M. G. Cox and P. M. Harris
Meas. Sci. Technol., 2006, 17, 533–540.

[The use of a Monte Carlo method for evaluating uncertainty and expanded uncertainty](#)

M. G. Cox, B. R. L. Siebert
Metrologia, 2006, **43(4)**, S178-S188.

[A two-stage Monte Carlo approach to the expression of uncertainty with non-linear measurement equation and small sample size](#)

S. V. Crowder and R. D. Moyer
Metrologia, 2006, **43(1)**, 34-41.

A new terminology for the approaches to the quantification of the measurement uncertainty

R. J. N. B. da Silva, J. R. Santos, M. F. G. F. C. Camões
Accred. Qual. Assur., 2006, **10**, 664-671.

Using Bayesian inference for parameter estimation when the system response and experimental conditions are measured with error and some variables are considered as nuisance variables

A. F. Emery, E. Valenti and D. Bardot
Meas. Sci. Technol., 2007, **18**, 19–29.

[An analytical method for calculating a coverage interval](#)

P. Fotowicz
Metrologia, 2006, **43(1)**, 42-45.

[Monte Carlo uncertainty calculations with small-sample estimates of complex quantities](#)

B. D. Hall
Metrologia, 2006, **43(3)**, 220-226.

[Computing uncertainty with uncertain numbers](#)

B. D. Hall
Metrologia, 2006, **43(6)**, L56-L61.

A novel method of estimating dynamic measurement errors

J. P. Hessling
Meas. Sci. Technol., 2006, **17**, 2740–2750.

[Bayesian alternative to the ISO-GUM's use of the Welch-Satterthwaite formula](#)

R. N. Kacker
Metrologia, 2006, **43(1)**, 1-11.

[Comparison of ISO-GUM, draft GUM supplement 1 and Bayesian statistics using simple linear calibration](#)

R. N. Kacker, B. Toman, D. Huang
Metrologia, 2006, **43(4)**, S167-S177.

[Coefficient of contribution to the combined standard uncertainty](#)

R. Kessel, R. N. Kacker, M. Berglund
Metrologia, 2006, **43(4)**, S189-S195.

[Resolution revisited](#)

I. Lira
Metrologia, 2006, **43(3)**, L14-L17.

[Implementation of a generalized least-squares method for determining calibration curves from data with general uncertainty structures](#)

M. J. T. Milton, P. M. Harris, I. M. Smith, A. S. Brown, B. A. Goody
Metrologia, 2006, **43(4)**, S291-S298.

[Exact calculation of the coverage interval for the convolution of two Student's t distributions](#)

S. Nadarajah
Metrologia, 2006, **43(5)**, L21-L22.

[Estimation of the modulus of a complex-valued quantity](#)

L. Oberto and F. Pennechi
Metrologia, 2006, **43(6)**, 531-538.

Optimised measurement uncertainty and decision-making when sampling by variables or by attribute

L. R. Pendrill
Measurement, 2006, **39**, 829-840.

[Between the mean and the median: the \$L_p\$ estimator](#)

F. Pennechi, L. Callegaro
Metrologia, 2006, **43(3)**, 213-219.

Visualization technique for uncertainty budgets: Onion charts

K. W. Pratt and D. L. Duewer
Accred. Qual. Assur., 2006, **10**, 527-530.

[Systematic approach to the modelling of measurements for uncertainty evaluation](#)

K. D. Sommer and B. R. L. Siebert
Metrologia, 2006, **43(4)**, S200-S210.

[Instrument resolution and measurement accuracy](#)

G. Taraldsen
Metrologia, 2006, **43(6)**, 539-544.

[Linear statistical models in the presence of systematic effects requiring a Type B evaluation of uncertainty](#)

B. Toman
Metrologia, 2006, **43(1)**, 27-33.

[Uncertainty analysis for vector measurands using fiducial inference](#)

C. M. Wang and H. K. Iyer

Metrologia, 2006, **43(6)**, 486-494.

[Principles of probability and statistics for metrology](#)

R. Willink

Metrologia, 2006, **43(4)**, S211-S219.

[On using the Monte Carlo method to calculate uncertainty intervals](#)

R. Willink

Metrologia, 2006, **43(6)**, L39-L42.

[Uncertainty analysis by moments for asymmetric variables](#)

R. Willink

Metrologia, 2006, **43(6)**, 522-530.

[The uncertainty associated with the weighted mean of measurement data](#)

N. F. Zhang

Metrologia, 2006, **43(3)**, 195-204.

[Calculation of the uncertainty of the mean of autocorrelated measurements](#)

N. F. Zhang

Metrologia, 2006, **43(4)**, S276-S281.

2007

[Parametric coverage interval](#)

L.-A. Chen, J.-Y. Huang, H.-C. Chen

Metrologia, 2007, **44(2)**, L7-L9.

[Evaluating the uncertainties of data rendered by computational models](#)

R. R. Cordero, G. Seckmeyer, F. Labbe

Metrologia, 2007, **44(3)**, L23-L30.

[Calculation of uncertainty in the presence of prior knowledge](#)

C. Elster

Metrologia, 2007, **44(2)**, 111-116.

Draft GUM Supplement 1 and Bayesian analysis

C. Elster, W. Wöger, M. G. Cox
Metrologia, 2007, **44(3)**, L31-L32.

Measurement uncertainty for multiple measurands: characterization and comparison of uncertainty matrices

W. Hässelbarth, W. Bremser
Metrologia, 2007, **44(2)**, 128-145.

Trapezoidal and triangular distributions for Type B evaluation of standard uncertainty

R. N. Kacker and J. F. Lawrence
Metrologia, 2007, **44(2)**, 117-127.

Uncertainty propagation in non-linear measurement equations

G. Mana, F. Pennechi
Metrologia, 2007, **44(3)**, 246-251.

Optimised Measurement Uncertainty and Decision-Making in Conformity Assessment

L. R. Pendrill
NCSLI Measure, 2007, 2, 76-86.

The propagation of uncertainty with calibration equations

D. R. White and P. Saunders
Meas. Sci. Technol., 2007, **18**, 2157–2169.

On the uncertainty of the mean of digitized measurements

R. D. Willink
Metrologia, 2007, **44(1)**, 73-81.

On the L_p estimation of a quantity from a set of observations

R. D. Willink
Metrologia, 2007, **44(2)**, 105-110.

Uncertainty and data-fitting procedures

R. D. Willink
Metrologia, 2007, **44(3)**, L33-L35.

Uncertainty of functionals of calibration curves

R. D. Willink

Metrologia, 2007, **44(3)**, 182-186.