P.Ciarlini, A.B. Forbes, **F.PAVESE** and D.Richter (eds.): "Advanced Mathematical Tools in Metrology, vol.4", Series on Advances in Mathematics for Applied Sciences vol. 53, World Scientific, Singapore, 2000

Contents

Foreword vii

An Efficient Algorithm for Template Matching 1
I. J. Anderson, J. C. Mason and D. A. Turner

A Mathematical Model of Geometric Errors in the Case of Specification and 3D Control of Mechanical Parts 11
E. Ballot and P. Bourdet

Optimisation Algorithms for Generalised Distance Regression in Metrology 21
M. Bartholomew-Biggs, B. P. Butler and A. B. Forbes

Quality Evaluation of Data Processing in Measurement: Bridge between Algorithms and Programs 32
I. B. Chelpanov, V. A. Granovsky and T. N. Siraya

An Application of Bootstrap Regression to Metrological Data with Errors in Both Variables 36
P. Ciarlini and G. Regoliosi

A Discussion of Approaches far Determining a Reference Value in the Analysis of Key-Comparison Data 45
M. G. Cox

P.Ciarlini, A.B. Forbes, **F.PAVESE** and D.Richter (eds.): "Advanced Mathematical Tools in Metrology, vol.4", Series on Advances in Mathematics for Applied Sciences vol. 53, World Scientific, Singapore, 2000

An IntegraI Equation and Its Numerical Treatment far the Computation of the Magnetic Field in Presence of Superconducting Shields 66
C. Dagnino, P. Lamberti and A. Negro

Evaluation of Lateral Shearing Interferograms 76
C. Elster

Error Component Determination of Multi-Axis Machines from 3D-Length Measurements 88
G. H. J. Florussen, F. L. M. Delbressine and P. H. J. Schellekens

Fusing Prior Calibration Information in Metrology Data Analysis 98
A. B. Forbes

Software Engineering Related Standards and Guidelines for Metrology 109
N. Greif and D. Richter

Measurement Uncertainty: A Probability Mathematical Model Based on the Estimation of a Confidence Belt 122
G. luculano and G. Pellegrini-Gualtieri

The Concept of Alpha-Shapes Applied to Three-Dimensional Metrology 133
C. Lartigue, B. Chevalier and L. Mathieu

P.Ciarlini, A.B. Forbes, **F.PAVESE** and D.Richter (eds.): "Advanced Mathematical Tools in Metrology, vol.4", Series on Advances in Mathematics for Applied Sciences vol. 53, World Scientific, Singapore, 2000

Building Numerical Libraries Using FORTRAN 90/95 143
Z. A. Maany

Quantum Stabilisation Techniques and Applications in Metrology 157
C. Macchiavello

Virtual Testing: Interaction with a Composite Model Using the Internet 162
N. J. McCormick

Uncertainty Estimation of Numerical1y Computed Quantities: A Case Study for the Twofold Derivative 171
M. Orlt and D. Richter

Mathematical Problems in the Definition of Standards Based on Scales: The Case of Temperature 182
F. Pavese

Overview of the UK Software Support for Metrology Programme 197
D. Rayner

Evaluation of Calibration Software Embedded in a 'Self-Calibrating' Instrument 202
G. Rietveld, J. Jacobson and M. Ohlsson

Approximating Coordinate Data that Has Outliers 210
C. Ross, I. J. Anderson, J. C. Mason and D. A. Turner

P.Ciarlini, A.B. Forbes, **F.PAVESE** and D.Richter (eds.): "Advanced Mathematical Tools in Metrology, vol.4", Series on Advances in Mathematics for Applied Sciences vol. 53, World Scientific, Singapore, 2000

Discussion of Methods far the Assessment of Uncertainties
in Monte Carlo Particle Transport Calculations 220
B. R. L. Siebert

Correlations of Data in Adjustements of the Fundamental Constants 230
V. Tuninsky

An Efficient Separation-of-Variables Approach to Parametric
Orthogonal Distance Regression 246
D. A. Turner, I. J. Anderson, J. C. Mason, M. G. Cox and A. B. Forbes

Some Robust Methods far Fitting Parametrically Defined Curves
or Surfaces to Measured Data 256
G. A. Watson

Testing far Correlations in Measurements 273
T. J. Witt

Roundtable Discussion on Issues in Uncertainty Estimation 289
M. G. Cox

Report on: Data Fusion Special Interest Group 297
G. Kelly

Report on: Special Interest Group "Metrology Software Engineering" 302
D. Richter

P.Ciarlini, A.B. Forbes, **F.PAVESE** and D.Richter (eds.): "Advanced Mathematical Tools in Metrology, vol.4", Series on Advances in Mathematics for Applied Sciences vol. 53, World Scientific, Singapore, 2000

Author lndex

Anderson I. J.

Ballot E.
Bartholomew-Biggs M.
Bourdet P.
Butler B. P.

Chelpanov I. B.
Chevalier B.
Ciarlini P.
Cox M. G.

Dagnino C.
Delbressine F. L. M.

Elster C.

Florussen G. H. J.
Forbes A. B.

Granovsky V. A.
Greif N.

Iuculano G.

Jacobson J.

Kelly G.

Lamberti P.
Lartigue C.

Maany Z. A.
Macchiavello C.
Mason J. C.
Mathieu L.
McCormick N. J.

Negro A.

Ohlsson M.
Orlt M.

Pavese F.
Pellegrini-Gualtieri G.

Rayner D.
Regoliosi G.
Richter D.
Rietveld G.
Ross C.

Schellekens P. H. J.
Siebert B. R. L.
Siraya T. N.

Tuninsky V.
Turner D. A.

Watson G. A.
Witt T. J.