

Table of Contents

Languages

OOP and Interval Arithmetic – Language Support and Libraries	1
<i>Jürgen Wolff von Gudenberg</i>	
C-XSC 2.0: A C++ Library for Extended Scientific Computing	15
<i>Werner Hofschuster, Walter Krämer</i>	

Software Systems and Tools

Libraries, Tools, and Interactive Systems for Verified Computations: Four Case Studies	36
<i>R. Baker Kearfott, Markus Neher, Shin'ichi Oishi, Fabien Rico</i>	
Multiple Precision Interval Packages: Comparing Different Approaches	64
<i>Markus Grimmer, Knut Petras, Nathalie Revol</i>	
Interval Testing Strategies Applied to COSY's Interval and Taylor Model Arithmetic	91
<i>George F. Corliss, Jun Yu</i>	

New Verification Techniques Based on Interval Arithmetic

Nonlinear Parameter and State Estimation for Cooperative Systems in a Bounded-Error Context	107
<i>Michel Kieffer, Eric Walter</i>	
Guaranteed Numerical Computation as an Alternative to Computer Algebra for Testing Models for Identifiability	124
<i>Eric Walter, Isabelle Braems, Luc Jaulin, Michel Kieffer</i>	
Interval Algorithms in Modeling of Multibody Systems	132
<i>Ekaterina Auer, Andrés Kecskeméthy, Martin Tändl, Holger Traczinski</i>	
Reliable Distance and Intersection Computation Using Finite Precision Geometry	160
<i>Katja Bühler, Eva Dyllong, Wolfram Luther</i>	
On Singular Interval Systems	191
<i>Götz Alefeld, Günter Mayer</i>	

Applications in Science and Engineering

Result-Verifying Solution of Nonlinear Systems in the Analysis
of Chemical Processes 198
*Thomas Beelitz, Christian Bischof, Bruno Lang,
Klaus Schulte Althoff*

Verified Numerical Analysis of the Performance of Switching
Systems in Telecommunication 206
Daniela Fausten, Gerhard Haßlinger

Result Verification for Computational Problems in Geodesy 226
Stefan Borovac, Gerhard Heindl

Global Optimization in the COCONUT Project 243
Hermann Schichl

An Application of Wavelet Theory to Early Breast Cancer 250
Baya Oussena, Abderrezak Henni, René Alt

Novel Approaches to Verification

Using PVS to Validate the Inverse Trigonometric Functions of an
Exact Arithmetic 259
David Lester

Novel Approaches to Numerical Software with Result Verification 274
Laurent Granvilliers, Vladik Kreinovich, Norbert Müller

Static Analysis-Based Validation of Floating-Point Computations 306
Sylvie Putot, Eric Goubault, Matthieu Martel

Author Index 315