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Literature
on Scientific Computation

1. Interval arithmetic and verification methods

A classification is appended to each title in this section, e.g. {ArNu}. The abbreviations have the following meaning:

Ar	=	Arithmetic, interval computation
Co	=	Compiler (on floppy disk) including handbook
Nu	=	Numerical methods, verification methods
Pr	=	Programming languages

Albrecht, R., Kulisch, U. (eds.): *Grundlagen der Computer-Arithmetik.* Computing Supplementum 1. Springer Verlag, Wien / New York, 1977. {ArNu}

Alefeld, G., Herzberger, J.: *Einführung in die Intervallrechnung.* Bibliographisches Institut (Reihe Informatik, Nr. 12), Mannheim / Wien / Zürich, 1974 (ISBN 3-411-01466-0). {ArNu}

Alefeld, G., Herzberger, J.: *An Introduction to Interval Computations.* Academic Press, New York, 1983 (ISBN 0-12-049820-0). {ArNu}

Alefeld, G., Grigorieff, R. D. (eds.): *Fundamentals of Numerical Computation (Computer-Oriented Numerical Analysis).* Computing Supplementum 2. Springer Verlag, Wien / New York, 1980. {ArNu}

Bleher, J. H., Kulisch, U., Metzger, M., Rump, S. M., Ullrich, Ch., Walter, W.: *FORTRAN-SC: A Study of a FORTRAN Extension for Engineering / Scientific Computation with Access to ACRITH.* Computing 39, Nov. 1987 (pp. 93-110). {ArPr}

Bohlender, G., Rall, L. B., Ullrich, Ch., Wolff v. Gudenberg, J.: *PASCAL-SC: Wirkungsvoll programmieren, kontrolliert rechnen.* Bibliographisches Institut, Mannheim / Wien / Zürich, 1986 (ISBN 3-411-03113-1). {ArPr}

Bohlender, G., Rall, L. B., Ullrich, Ch., Wolff v. Gudenberg, J.: *PASCAL-SC: A Computer Language for Scientific Computation.* Academic Press (Perspectives in Computing, vol. 17), Orlando, 1987 (ISBN 0-12-111155-5). {ArPr}

Braune, K.: *Standard functions for real and complex point and interval arguments with dynamic accuracy.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Ar}

Braune, K: *Hochgenaue Standardfunktionen für reelle und komplexe Punkte und Intervalle in beliebigen Gleitpunktrastern.* Dissertation, Universität Karlsruhe, 1987. {Ar}

Cordes, D.: *Stability test for periodic differential equations on digital computers with applications.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Nu}

Cordes, D., Kaucher, E.: *Self-validating computation for sparse matrix problems.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Nu}

Corliss, G. F.: *Computing Narrow Inclusions for Definite Integrals.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Nu}

Grüner, K.: *Solving complex problems for polynomials and linear systems with verified high accuracy.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Nu}

Kaucher, E., Kulisch, U., Ullrich, Ch. (eds.): *Computerarithmetic, Scientific Computation and Programming Languages.* B. G. Teubner Verlag, Stuttgart 1987 (ISBN 3-519-02448-9). {ArNuPr}

Kaucher, E., Miranker, W. L.: *Self-Validating Numerics for Function Space Problems.* Academic Press, 1984 (ISBN 0-12-402020-8). {Nu}

Krämer, W.: *Inverse standard functions for real and complex point and interval arguments with dynamic accuracy.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Ar}

Krämer, W.: *Inverse Standardfunktionen für reelle und komplexe Intervallargumente mit a priori Fehlerabschätzungen für beliebige Datenformate.* Dissertation, Universität Karlsruhe, 1987. {Ar}

Kulisch, U.: *Grundlagen des Numerischen Rechnens.* Bibliographisches Institut. (Reihe Informatik, Nr. 19), Mannheim/Wien/Zürich 1976 (ISBN 3-411-01517-9). {Ar}

Kulisch, U. (ed.): *PASCAL-SC: A PASCAL extension for scientific computation; information manual and floppy disks; version IBM PC/AT; operating system DOS.* B. G. Teubner Verlag (Wiley-Teubner series in computer science), Stuttgart, 1987 (ISBN 3-519-02106-4 / 0-471-91514-9). {Co}

Kulisch, U. (ed.): *PASCAL-SC: A PASCAL extension for scientific computation; information manual and floppy disks; version ATARI ST.* B. G. Teubner Verlag, Stuttgart, 1987 (ISBN 3-519-02108-0). {Co}

Kulisch, U., Miranker, W. L. (eds.): *A New Approach to Scientific Computation.* Academic Press, New York, 1983 (ISBN 0-12-428660-7). {ArNuPr}

Kulisch, U., Miranker, W. L.: *Computer Arithmetic in Theory and Practice.* Academic Press, New York, 1981 (ISBN 0-12-428650-x). {ArPr}

Kulisch, U., Miranker, W. L.: *The Arithmetic of the Digital Computer: A New Approach.* SIAM Review, Vol. 28, No. 1, March 1986 (pp. 1-40). {ArNuPr}

Kulisch, U., Stetter, H. J. (eds.): *Scientific Computation with Result Verification.* Computing Supplementum 6. Springer Verlag, Wien / New York, 1988. {ArNu}

Kulisch, U., Ullrich, Ch. (eds.): *Wissenschaftliches Rechnen und Programmiersprachen.* B. G. Teubner Verlag (Berichte des German Chapter of the ACM), Stuttgart, 1982 (ISBN 3-519-02429-2). {ArNuPr}

Lohner, R. J.: *Enclosing the solutions of ordinary initial and boundary value problems.* In : Kaucher / Kulisch / Ullrich: Computerarithmetic, Scientific Computation and Programming Languages. {Nu}

Lohner, R. J.: *Einschließung der Lösung gewöhnlicher Anfangs- und Randwertaufgaben und Anwendungen.* Dissertation, Universität Karlsruhe, 1988. {Nu}

2. ACRITH, FORTRAN-SC and ARITHMOS

2.1 ACRITH

IBM High-Accuracy Arithmetic Subroutine Library (ACRITH). *General Information Manual.* GC 33-6163-02, 3rd Edition, April 1986.

IBM High-Accuracy Arithmetic Subroutine Library (ACRITH). *Program Description and User's Guide.* SC 33-6164-02, 3rd Edition, April 1986.

IBM High-Accuracy Arithmetic Subroutine Library (ACRITH). *Reference Summary.* GX 33-9009-02, 3rd Edition, April 1986.

IBM System/370 RPQ. *High Accuracy Arithmetic.* SA 22-7093-0, 1984.

2.2 FORTRAN-SC

Bleher, J. H., Kulisch, U., Metzger, M., Rump, S. M., Ullrich, Ch., Walter, W.: *FORTRAN-SC: A Study of A FORTRAN Extension for Engineering / Scientific Computation with Access to ACRITH.* Computing 39, Nov. 1987 (pp. 93-110).

FORTRAN-SC: *FORTRAN for Scientific Computation. Description and Sample Programs.* Institute for Applied Mathematics, University of Karlsruhe P.O.Box 6980, D-7500 Karlsruhe, West Germany, 1988.

Metzger, M.: *FORTRAN-SC: A FORTRAN Extension for Engineering / Scientific Computation with Access to ACRITH, Demonstration of the Compiler and Sample Programs.* Institute for Applied Mathematics, University of Karlsruhe, P.O.Box 6980, D-7500 Karlsruhe, West Germany, 1987.

Walter, W.: *FORTRAN-SC: A FORTRAN Extension for Engineering / Scientific Computation with Access to ACRITH, Language Description with Examples.* Institute for Applied Mathematics, University of Karlsruhe, P.O.Box 6980, D-7500 Karlsruhe, West Germany, 1987.

2.3 ARITHMOS

ARITHMOS Benutzerhandbuch. SIEMENS AG, Bestellnummer U2900-J-Z87-1, Sept. 1986.

3. The optimal scalar product

3.1 Implementations

Bohlender, G., Grüner, K.: *Realization of an Optimal Computer Arithmetic*. In: Computer Arithmetic, Scientific Computation and Programming Language (E. Kaucher, U. Kulisch, Ch. Ullrich, Eds.), B. G. Teubner Verlag, Stuttgart, 1987.

Bohlender, G., Teufel, T.: *BAP-SC: A Decimal Floating-Point Processor for Optimal Arithmetic*. In: Computer Arithmetic, Scientific Computation and Programming Languages (E. Kaucher, U. Kulisch, Ch. Ullrich, Eds.), B. G. Teubner Verlag, Stuttgart, 1987.

Kirchner, R., Kulisch, U.: *Arithmetic for Vector Processors. Proceedings of the 8th Symposium on Computer Arithmetic of the IEEE Computer Society.* Como / Italy, May 1987.

Kirchner, R., Kulisch, U.: *Accurate Arithmetic for Vector Processing*. Journal of Parallel and Distributed Computing (Academic Press), special issue on "High Speed Computer Arithmetic". To appear 1988.

Kulisch, U., Bohlender, G.: *Features of a Hardware Implementation of an Optimal Arithmetic*. In: Computer Arithmetic, Scientific Computation and Programming Languages (E. Kaucher, U. Kulisch, Ch. Ullrich, Eds.), B. G. Teubner Verlag, Stuttgart, 1987.

Kulisch, U., Miranker, W. L.: *The Arithmetic of the Digital Computer: A New Approach*. SIAM-Review, Vol. 28, No. 1, March 1986, (pp. 1-40).

Teufel, T.: *Ein optimaler Gleitkommaprozessor*. Dissertation, Universität Karlsruhe, 1984.

3.2 Applications

Kaucher, E., Kulisch, U., Ullrich, Ch. (eds.): *Computerarithmetic, Scientific Computation and Programming Languages*. B. G. Teubner Verlag, Stuttgart 1987 (ISBN 3-519-02448-9).

Kulisch, U., Miranker, W. L. (eds.): *A New Approach to Scientific Computation*. Proceedings of the Symposium held at the IBM Research Center, Yorktown Heights, N. Y., 1982. Academic Press, New York, 1983 (ISBN 0-12-428660-7).

Miranker, W. L., Mascagni, M.: *Case Studies for Argumented Floating-Point Arithmetic in Accurate Scientific Computations*. Editors: Miranker, W. L., and Toupin, R. H.: Lecture Notes in Computer Sciences, Springer-Verlag, 1985.