

Finite Precision Number Systems and Arithmetic (Encyclopedia of Mathematics and its Applications, 133)

By Peter Kornerup, David W. Matula

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Fundamental arithmetic operations support virtually all of the engineering, scientific, and financial computations required for practical applications, from cryptography, to financial planning, to rocket science. This comprehensive reference provides researchers with the thorough understanding of number representations that is a necessary foundation for designing efficient arithmetic algorithms. Using the elementary foundations of radix number systems as a basis for arithmetic, the authors develop and compare alternative algorithms for the fundamental operations of addition, multiplication, division, and square root with precisely defined roundings. Various finite precision number systems are investigated, with the focus on comparative analysis of practically efficient algorithms for closed arithmetic operations over these systems. Each chapter begins with an introduction to its contents and ends with bibliographic notes and an extensive bibliography. The book may also be used for graduate teaching: problems and exercises are scattered throughout the text and a solutions manual is available for instructors.

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"For researchers and more mathematically oriented readers, this book is a treasure trove of algorithms difficult or impossible to find elsewhere. For engineers and researchers interested in tomorrow's technology, this one, written by highly respected experts in the field, is the book to have one one's bookshelf."
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About the Author
Peter Kornerup is a Professor in the Department of Mathematics and Computer Science at the University of Southern Denmark, Odense.

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