

**A Review of the Book / Рецензия на книгу**

**A. Neumaier, Interval Methods for Systems of Equations, Encyclopedia of Mathematics and its Applications. Cambridge University Press, Cambridge etc., 1990.**

The book under consideration contains results from interval analysis up to the year 1990 which are necessary or useful for solving systems of linear and nonlinear equations. The book is divided into 6 Chapters:

1. Basic properties of interval arithmetic
2. Enclosures for the range of a function
3. Matrices and sublinear mappings
4. The solution of square linear systems of equations
5. Nonlinear systems of equations
6. Hull computation

Furthermore there are some 360 references, an author index and a subject index.

The first Chapter contains essentially the usual things: Intervals, arithmetic for intervals, algebraic properties, distance and topology. Fundamental for the application of interval arithmetic are tools which include the range of real functions. These are considered in Chapter 2. In Chapter 3 the author gives a modern representation of a series of facts for interval

matrices: Basic facts, norms and spectralradius, distance and topology, linear interval equations, sublinear mappings,  $M$ -matrices and inverse positive matrices,  $H$ -matrices. The concept of a sublinear mapping, originally introduced by the author of the book, is then systematically used in Chapter 4 (the solution of square linear systems: preconditioning, Krawczyk's method and quadratic approximation, Gauss-Seidel Iteration, linear fixed point equations, interval Gauss elimination) and Chapter 5 (Nonlinear systems of equations: existence and uniqueness, interval iteration, set valued functions, zeros of continuous functions, parameter dependent equations, global problems). The final Chapter 6 is concerned with the computation of the so-called hull of a linear system.

The book is written on a very high level. Also specialists can find a lot of new results. For every researcher in this field it is a must to read this book.

G. Alefeld

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