Numerical linear algebra

Trefethen, Lloyd N., author

Abstrak

Numerical Linear Algebra is a concise, insightful, and elegant introduction to the field of numerical linear algebra. Designed for use as a stand-alone textbook in a one-semester, graduate-level course in the topic, it has already been class-tested by MIT and Cornell graduate students from all fields of mathematics, engineering, and the physical sciences. The authors' clear, inviting style and evident love of the field, along with their eloquent presentation of the most fundamental ideas in numerical linear algebra, make it popular with teachers and students alike.

Numerical Linear Algebra aims to expand the reader's view of the field and to present the core, standard material in a novel way. It is a perfect companion volume to the encyclopedic treatment of the topic that already exists in Golub and Van Loan's now-classic Matrix Computations. All of the most important topics in the field, including iterative methods for systems of equations and eigenvalue problems and the underlying principles of conditioning and stability, are covered. Trefethen and Bau offer a fresh perspective on these and other topics, such as an emphasis on connections with polynomial approximation in the complex plane.

Numerical Linear Algebra is presented in the form of 40 lectures, each of which focuses on one or two central ideas. Throughout, the authors emphasize the unity between topics, never allowing the reader to get lost in details and technicalities. The book breaks with tradition by beginning not with Gaussian elimination, but with the QR factorization--a more important and fresher idea for students, and the thread that connects most of the algorithms of numerical linear algebra, including methods for least squares, eigenvalue, and singular value problems, as well as iterative methods for all of these and for systems of equations.