variables. Richardson, himself, had known that his data needed some sort of initialization, blaming errors on initial winds and discussing this critical issue in WPNP and its revision file that he maintained until 1951.

Lynch carefully describes the basic equations required. He's more willing to approximate than Richardson. Moreover, he converts Richardson's quite idiosyncratic descriptions into computational algorithms, supplanting the computing forms that supplemented WPNP. Indeed, he also describes Richardson's concept of a forecast factory, which might employ thousands of cleverly organized human computers. If the atmosphere is indeed chaotic, like the Lorenz attractor of 1963 [4], we have to anticipate ongoing challenges due to the limits to predictability.

This well-written history clearly displays the success and practical importance of applied mathematics. Thanks, Peter, for demonstating that the swinging spring [5] isn't just for fun.

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Computational Methods of Linear Algebra. Second Edition. *By Granville Sewell.* Wiley-Interscience, Hoboken, NJ, 2005. $111.50. x+268 pp., hardcover. ISBN 0-471-73579-5.

One could fill a book discussing applications of computational linear algebra. While Granville Sewell has not enumerated such an extensive list, his textbook *Computational Methods of Linear Algebra* establishes a strong foundation for upper-level undergraduate and graduate students interested in this field. The book establishes a strong theoretical basis for its content while repeatedly ensuring that the reader thoroughly understands many underlying computational issues. A student studying this text would undoubtedly be exposed to the diverse demands of computational linear algebra—theoretical development, algorithmic analysis, and application of such methods to real-world problems.

The first chapter of this text provides a brief primer on important results from linear algebra. For students lacking or rusty in such topics, a supplemental source would be needed. The following four chapters, "in short, attack everything that begins with the word 'linear'." These chapters discuss and analyze direct and indirect methods for the solution of linear systems of equations, linear least squares problems, linear eigenvalue problems, and linear programming. The next chapter presents the fast Fourier transform, which is a topic often omitted from comparable resources. The final chapter introduces topics in programming for vector and parallel supercomputers.

This textbook offers a diversity of perspectives on computational linear algebra that should increase its usefulness in a variety of disciplines. The author often motivates the need for a computational method through an application. In some cases, the deficiencies of one algorithm prompt either the refinement of an algorithm or serve as motivation for another method. For instance, the computational intensity of Gaussian elimination leads to a discussion regarding LU factorization which, in turn, unfolds a section on solving banded systems that commonly result from discretizing partial differential equations.

The book is sprinkled with a variety of applications that can be suitably addressed with computational linear algebra. A reader can learn how to rank college football teams from the results of a least squares problem. A student also learns the advantage of using the discrete Fourier transform to recognize periodic tendencies in recorded temperature data. Selected exercises require utilizing such computational methods to approach a variety of the applications presented in the book.

All codes, originally authored in Fortran, are included in the appendix in MATLAB with both versions available on the text's accompanying web site. While the availability of MATLAB codes is a handy feature of the second edition, one should note that such codes closely emulate their Fortran counterparts. That is, other than the translation of Fortran commands to MATLAB commands, the syntax has the appearance of Fortran which some students might find cumbersome and unnatural. Further, all codes within the chapters are written in Fortran. This is important for a professor to consider before adopting the book as the author carefully examines the codes and refers to specific segments of the programs in analyzing computational efficiency. Further, students are often asked in the exercises to adapt existing code.

Textbooks are often judged, in part, by their exercises. Most of the chapters in this book conclude with close to a dozen exercises. Such exercises range from theoretical questions that involve a proof to modifying existing code from the text for some computational variation on the printed algorithm. Professors who wanted to take advantage of such diversity of questions would likely find the exercises well suited for their classes. However, if they wanted to concentrate more on the programming and computational aspects of numerical linear algebra, they would benefit from viewing an evaluation copy of the text to ensure sufficient robustness of the questions. Nonetheless, the author crafts a strong set of questions that would deepen a student's understanding of the topics and clarify areas of misunderstanding.

Sewell has written a readable textbook on a topic with wide applicability. The theory and algorithmic complexity of the topics are often complemented with intuitive motivation. Sewell often offers insightful summaries of a proof or computational algorithm that would strongly benefit students.

This book offers a student a library of programs that efficiently execute a large variety of important algorithms in computational linear algebra. Further, the theoretical exposition and intuitive insight of an experienced computational linear algebraist offers an excellent introduction to this field. Indeed, students should be forewarned about the danger in reselling such a book, even with its list price of over one hundred dollars, as it should serve as a helpful resource long after a term of study ends.

Like most textbooks, deciding whether this book would be a resource of choice depends in large measure on the goals of the particular course. However, this robust text is well worth an evaluation for anyone interested in teaching such topics. If this book or a subset of its content were used, students would undoubtedly benefit from the tutelage it offers.

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Kolmogorov's Heritage in Mathematics. *Edited by É. Charpentier, A. Lesne, and N. Nikolski.* Springer, Berlin, 2007. $59.95. viii+317 pp., hardcover. ISBN 978-3-540-36349-1.

In *Men of Mathematics* (Simon and Schuster, New York, 1937), Bell calls Poincaré the last universalist. The work of Kolmogorov shows this to have been a premature judgment.