methods, hybrid finite difference vortex methods, contour dynamics and numerical experiments performed using these methods. Topics in the fourth part revolve around three-dimensional computations for incompressible flows: vortex rings, vortex sheets, dynamics of vortex tubes in turbulence are some of the subjects addressed here. Finally, the fifth part consists of four articles which focus on the numerical simulation of reacting and compressible flows.

The titles of the papers are as follows: 1. Local spectral analysis of turbulent flows using wavelet transforms; 2. Operator splitting for Navier-Stokes and Chorin-Marsden product formula; 3. Velicity methods: Lagrangian numerical methods which preserve the Hamiltonian structure of incompressible flows; 4. Statistical mechanics for the vortex model; 5. On singular solutions of the Vlasov-Poisson equations; 6. Point vortices and localization in Euler flows; 7. Turbulence modeling for incompressible vortex flow; 8. Investigation of the use of the Prandtl/Navier-Stokes equation procedures for two-dimensional incompressible flows; 9. Vorticity boundary conditions for the Navier-Stokes equation in velocity-vorticity formulation; 10. A coupled potential-boundary layer calculation method for unsteady flows around airfoils; 11. Viscous simulation of wake patterns; 12. The vorton methods; 13. Numerical simulation of unsteady flows behind cylindrical structures using a finite difference-particle superposition algorithm; 14. Moment accelerated contour surgery; 15. Direct numerical simulations using vortex methods; 16. Numerical study of the motion and deformation of two-dimensional bubbles by a vortex method; 17. A hybrid vortex method with deterministic diffusion; 18. A slightly diffusive contour dynamics; 19. Model coherent structure dynamics: vortex reconnection, core dynamics and interaction with turbulence; 20. The nonlinear dynamics of a jet shear layer with swirl; 21. Dynamics of vortex tubes in three-dimensional turbulence; 22. Numerical simulation of axisymmetric vortex sheet roll-up; 23. Free vortex rings, analogies and differences between vorticity and a passive scalar; 24. Turbulent eddy structures, combustion and chemical reactions; 25. Vortex generation and evolution in numerical simulation of transitional shear flows; 26. Stability analysis of differentially-heated asymmetric vorticity layers; 27. A particle in cell method for the 2-D compressible Euler equations.

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5[90C05, 90C06].—AMI ARBEL, *Exploring Interior-Point Linear Programming: Algorithms and Software*, Foundations of Computing Series, The MIT Press, Cambridge, MA, 1993, xxiv + 211 pp., 23 cm. Price: Softcover (includes floppy disk with DOS program) $35.00.

Interior-point methods have proved to be powerful and elegant techniques for solving linear programming problems, and their study is now being incorporated into introductory courses on linear programming. It is now possible to present some of the fundamental ideas concisely and with simple mathematical tools. Nevertheless, students often develop the idea that codes implementing interior-point methods need to be highly sophisticated, or else they will fail owing to ill-conditioning, or may behave poorly. This book makes a splendid contribution

towards the goal of educating a wide audience in the computational aspects of interior-point methods. It will show a student that a simple implementation and a few numerical precautions suffice to produce software that works.

The book comes with a diskette containing a software package implementing three interior-point methods: a primal method, a dual method and a primal-dual method. The software is designed to be used on IBM compatibles under DOS, and its primary goal is to be educational. It is not sophisticated and, as the author points out from the outset, this software is neither as versatile nor as powerful as the leading codes currently being used to solve very large problems. The book is a self-contained and very readable manual for the software that provides sufficient background in linear programming and interior-point methods to be used for instruction or for self-education. The book can be understood by students and professionals with a minimum background in linear programming and mathematics.

The author succeeds in making the presentation clear and simple. However, the emphasis on clarity makes the presentation too repetitive at places. Also missing, in my view, is a clear explanation of the strengths of the primal-dual approach. But these relatively minor flaws do not prevent this book, and the accompanying software, from being a valuable educational tool in linear programming.

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6[90C05, 90C10, 90C20, 90C30, 90C35].—JORGE J. MORÉ & STEPHEN J. WRIGHT, *Optimization Software Guide*, Frontiers in Applied Mathematics, Vol. 14, SIAM, Philadelphia, PA, 1993, xii + 154 pp., $25\frac{1}{2}$ cm. Price: Softcover $24.50.

This is a very valuable book for anyone interested in using optimization codes, and for all those wishing to learn about the state-of-the-art in this field. The book lists most of the currently available software for solving various classes of optimization problems, such as linear programming, integer programming, network optimization and nonlinear optimization, and describes how the software can be obtained. Many readers will be pleasantly surprised to find that much of it is distributed freely on the Internet.

The book begins by classifying optimization problems in various categories, and gives a lucid and concise description of each of these categories. Readers with limited knowledge of optimization and numerical analysis will have very little difficulty reading through this summary, which gives a nice overview of the field. The book then proceeds to give a short description of each of the software packages, and a list of the software in each category. As explained by the authors, some areas of optimization, such as stochastic programming (or programming under uncertainty) are not included because general-purpose software is not yet readily available. Nevertheless, the book covers a wide range of problems, and one would hope that it finds wide dissemination in industry, where it can be extremely valuable. The book can also be used as a teaching aid in optimization courses.

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