

delightful treat to readers with deeper mathematical interests and is likely to draw the attention of researchers in applied mathematics, as it has done in the analogous fields of elastostatics and elastodynamics. Furthermore, readers with an interest in the field of computational science will be intrigued by the discussion of advanced computational procedures for solving the integral equations describing flow past collections of particles with reference to parallel computation.

The book consists of nineteen chapters and is divided into four parts according to geometrical configuration. Each section is followed by exercises with varying degrees of difficulty, with the objective of supplementing and extending the theory and filling in the details.

Part I, "Governing Equations and Fundamental Theorems," introduces the equations governing creeping flow with suspended particles. It contains the first two chapters: "Microhydrodynamic Phenomena," and "General Properties and Fundamental Theorems." Uniqueness of solution, energy dissipation theorems and their application to estimate the forces exerted on particles, the boundary integral representation, and the mathematical origin of the multi-pole expansion method are discussed.

Part II focuses on the "Dynamics of a Single Particle." Exact and asymptotic solutions are presented via singularity and functional expansion methods in spherical coordinates, and the mobility and resistance problems are defined. This part concludes with a chapter on unsteady Stokes flow or linearized Navier-Stokes flow that contains some original contributions and indicates avenues for further development.

Part III considers "Hydrodynamic Interactions" (that is, flows in the presence of two or more suspended particles) and outlines methods for computing mutual hydrodynamic effects. The resistance and mobility problems for multi-particle systems are formalized, an instructive discussion of the method of reflections for well-separated particles is presented, and asymptotic methods for well-separated particles and particles with disparate sizes are discussed. Furthermore, the two-sphere problem is analyzed in an exhaustive manner. The last chapter in this part introduces the application of numerical methods to compute creeping flow in the context of the multi-pole collocation method.

Part IV is dedicated to developing and solving the integral equations that describe flow in a container with suspended particles. The five chapters in this part are grouped under the general heading "Foundations of Parallel Computational Microhydrodynamics." The properties of the integral equations arising from boundary integral representations of Stokes flow are discussed in detail, and a proper boundary integral formulation leading to integral equations of the second kind (called the completed double-layer representation) is developed. Some advanced concepts of functional analysis and operator theory are used to explain the procedures, and the

book also provides adequate references for background reading. All this discussion is geared towards developing convergent iterative methods of solutions that can be carried out on parallel processors: each particle is assigned to a different processor, the problem is solved locally, and the processors communicate every few iterations to let the other processors know about the local behavior of the flow. The authors are generous enough to make computer programs available to the public (but note that there is an update on the procedures).

I highly recommend this book as a text for an introductory or advanced course on colloidal science, low-Reynolds-number hydrodynamics, boundary integral methods, or advanced scientific computing. Furthermore, in the opinion of this reviewer, the book belongs on the bookshelf of any chemical engineer who has a direct or a peripheral interest in fluid flow. □

ChE books received

Electron Paramagnetic Resonance: Elementary Theory and Practical Applications, by Weil, Bolton, and Wertz; Wiley Interscience, 605 Third Ave., New York, NY 10158; 568 pages, \$79.95 (1994)

Intermediate Organic Chemistry, 2nd edition, by John Stowell; Wiley Interscience, 605 Third Ave., New York, NY 10158; 334 pages, \$49.95 (1994)

Information Theory in Analytical Chemistry, by Karel Eckschlager and Klaus Danzer; Wiley Interscience, 605 Third Ave., New York, NY 10058; 275 pages, \$64.95 (1994)

Low Energy Ion-Surface Interactions, Edited by J. Wayne Rabalais; Wiley & Sons, 605 Third Ave., New York, NY 10058; 594 pages, \$120 (1994)

The Surface Science of Metal Oxides, by V.E. Henrich and P. A. Cox; Cambridge University Press, 40 West 20th St., New York, NY 10011-4211; 464 pages, \$84.95 (1994)

Progress in Inorganic Chemistry, Vol. 41, edited by Kenneth D. Karlin; Wiley Interscience, 605 Third Ave., New York, NY 10058; 848 pages, \$125 (1994)

Chemical Dynamics at Low Temperatures, by Benderskii, Makarov, and Wight; Wiley Interscience, 605 Third Ave., New York, NY 10158; 385 pages, \$74.95 (1994)

Practical NIR Spectroscopy; With Applications in Food and Beverage Analysis, 2nd edition, by Osborne, Fearn, and Hindle; Wiley Interscience, 605 Third Ave., New York, NY 10158; 227 pages, \$89.95 (1993)

Design and Analysis of Experiments: Vol 1. Introduction to Experimental Design, by Hinkelmann and Kempthorne; Wiley Interscience, 605 Third Ave., New York, NY 10158; 495 pages \$49.95 (1994)

Electron Paramagnetic Resonance: Elementary Theory and Practical Applications, by Weil, Bolton, and Wertz; Wiley Interscience, 605 Third Ave., New York, NY 10158; 568 pages, \$79.95 (1994)

ERRATA

There were several errors in the spring-issue article detailing the history of the Corcoran Award:

- ▷ The venue for the first Corcoran Award was the Division banquet in the University of Cincinnati ASEE meeting, not the Lake Tahoe meeting (which was the venue for the second award to Bob Bird).
- ▷ Richard Felder's award winning paper was "The Generic Quiz" [*CEE*, 19(4), 176 (1985)] and not his paper on cheating which was mistakenly cited.
- ▷ Table 1 also listed E. Dendy Sloan's affiliation as Colorado State University when it is, in fact, the Colorado School of Mines.

We apologize both to the individuals and to our readers for the errors.