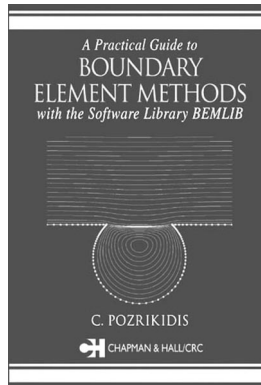


viewer does not see this book as a primary reading, but everyone interested in fundamentals and deep theoretical approach to fluid mechanics should become acquainted with it.

5R41. Practical Guide to Boundary Element Methods with the Software Library BEMLIB. - C Pozrikidis (UCSD). Chapman and Hall/CRC, Boca Raton FL. 2002. 423 pp. ISBN 1-58488-323-5. \$99.95.

Reviewed by Jeng-Tzong Chen (Dept of Harbor and River Eng, Natl Taiwan Ocean Univ, PO Box 7-59, Keelung, Taiwan, 202, ROC).

This book provides a concise introduction to the theory and implementation of the boundary element method (BEM). It emphasizes programming aspects with the software library BEMLIB, available from the internet site <http://bemlib.ucsd.edu> or <http://stokes.ucsd.edu>. Well over a dozen textbooks on the BEM have been published over the years. Many of these have been written by authors whose background is in solid mechanics, as opposed to fluid mechanics; few books include problems and exercises. The present book provides problems in the end of each section to complement and extend the theory. As is common with other books on BEM, this text begins



with the integral formulation and boundary-element implementation of Laplace equations (1D, 2D, and 3D) in Chapters 1–5. Indirect formulations in terms of single-layer and double-layer representations for 2D cases are developed in Chapter 2, and axisymmetric formulations are discussed in Chapter 4. Special topics, including the treatment of inhomogeneous, nonlinear, and time-dependent problems are discussed in Chapter 6. The method of particular solutions and the dual reciprocity BEM are addressed to transform domain integrals for 1D, 2D, and 3D problems. Since the author's background is in fluid mechanics, this topic is further discussed in Chapter 7, and corresponding material in elasticity is given in an Appendix in the form of a primer.

The user guide of BEMLIB is given in Chapter 8. Although this book can be used as a text in a course, it contains some original results regarding the application of radial basis function (RBF) and the regular-

ization of hypersingularity. The user guide of the software library will be of practical interest to students and engineers. This book will be read by graduate students and engineers. The generation of lines and surfaces for 2D and 3D problems, respectively, is given in Chapter 9. A handy user manual of the three programs for Laplace, Helmholtz, and Stokes flow are given in Chapters 10–12. The source files are available from the website. The author has succeeded in fulfilling his aim of dual-purpose by providing a textbook for teachers, undergraduate, and graduate students, as well as a reference for researchers and engineers. The quality of print and figures is adequate. In general, *Practical Guide to Boundary Element Methods with the Software Library BEMLIB* is a well-written book and is recommended to individuals and libraries.

5N42. Advanced Hypersonic Test Facilities. - Edited by FK Lu (Dept of Mech and Aerospace Eng, Univ of Texas, Arlington TX) and DE Marren (Arnold Eng Dev Center, USAF). AIAA, Reston VA. 2002. 639 pp. ISBN 1-56347-541-3. \$99.95.

This book presents a number of new, innovative approaches to satisfying the enthalpy requirements for air-breathing hypersonic vehicles and planetary entry problems. It covers hypersonic test requirements; principles of hypersonic test facility development; shock tunnels; long duration hypersonic facilities; ballistic ranges, sleds, and tracks; and advanced technologies for next-generation hypersonic facilities.

5N43. New Results in Numerical and Experimental Fluid Mechanics III. Contributions to the 12th STAB/DGLR 2000 Symp, Stuttgart, Germany. - Edited by S Wagner, U Rist (*Inst für Aerodyn und Gasdyn, Univ Stuttgart, Pfaffenwaldring 21, Stuttgart, D-70569, Germany*), HJ Heinemann (*Inst für Aerodyn und Gasdyn, DLR, Bunsenstr 10, Göttingen, D-37073, Germany*), R Hilbig (*Tech Programmes "Flight Physics," DaimlerChrysler Aerospace Airbus, Hünefeldstr 1-5, Bremen, D-28199, Germany*). Springer-Verlag, Berlin. 2002. 433 pp. ISBN 3-540-42696-5. \$219.99.

This volume contains 50 papers presented at the symposium that are based on research and project work in numerical and experimental fluid mechanics and aerodynamics for aerospace and other applications.

5N44. Thermal Spray 2001: New Surfaces for a New Millennium. Proc of ITSC 2001. - Edited by CC Berndt, KA Khor, EF Lugscheider. ASM Int, Materials Park OH. 2001. 1381 pp. ISBN 0-87170-737-3. \$225.00.

Papers in this proceedings cover the following topics: Applications (17 papers), Thermal barrier coatings (9), Ceramics, intermetallics, and metal composite coatings (14), Polymer feedstocks and coatings (6), Nanostructured materials (7), Cold spray processes and coatings (6), Equipment and systems (17), Coating treatments (8), Microstructural focused studies (11), Diagnostics and process control (13), Formation impact and solidification of droplets (10), Modeling and simulation (14), Mechanical properties (10), Wear and erosion (12), Corrosion properties and characteristics (12), Nondestructive testing and quality control (7), and Commercial aspects (7). Also included is an historical endnote: The origins of thermal spray literature.

VI. HEAT TRANSFER

5R45. Fundamentals of Surface Mechanics with Applications, Second Edition. Mechanical Engineering Series. - FF Ling (*Manuf Syst Center, Univ of Texas, Austin TX 78712*), WM Lai (*Dept of Mech Eng, Columbia Univ, New York NY 10027*), DA Lucca (*Sch of Mech and Aerospace Eng, Oklahoma State Univ, Stillwater OK 74078*). Springer-Verlag, New York. 2002. 392 pp. ISBN 0-387-95423-6. \$69.95.

Reviewed by P Puri (Dept of Math, Univ of New Orleans, 2000 Lakeshore Dr, New Orleans LA 70148).

This is a very well written book. The reader is assumed to be familiar with introductory continuum mechanics. Adequate references are given for the elementary continuum mechanics. This book explores the topic of surface mechanics using classical continuum mechanics throughout. The authors have successfully accomplished their stated purpose of setting down concrete examples dealing with surface mechanics and of providing analytical tools relevant to quantitative study of surface mechanics. The book can be used as a reference for understanding fundamental problems in surface mechanics by researchers and can also be used as textbook on this subject. While the book covers a wide range of topics, no mention of surface waves has been made. The organization of the material is as follows:

Chapter 1 is concerned with the basic equations of balance of momentum and energy, a discussion of entropy, constitutive equations, and energy balance for an elastic solid. Then there is a section on constitutive relations for heat conduction. Fick's and Darcy's laws are given in Section 6. Sections 7–11 contain constitutive relations for linearly viscous fluids, perfectly plastic bodies, viscoelastic bodies, Maxwellian dielectric, and classical electromagnetic theory, respectively. This chapter can be used as quick reference for constitutive equations for a variety of combined fields.

The first section in each of the remaining chapters introduces the main subject of the chapter. There are, in all, 24 main sections in Chapter 2. Sections 2–16, 18, and 22 give solutions to some typical problems of heat conduction. Section 17 is on the finite Fourier transform, 19 on Legendre polynomials, 20 on Legendre series, 21 on the Legendre transform, 23 on the Fourier cosine transform, and Section 24 contains a discussion on the effects of temperature dependent thermal conductivity and specific heat. There are 13 solved examples and 12 exercises.

Elastic problems for the half-space and circular cylinders are discussed in Chapter 3. Sections 2 and 3 list the stress-strain relations and the equations of motion. Section 4 lists the Papkovitch-Neuber functions and the differential equations satisfied by them. Sections 5–13 present the solutions to the