others whose names did not appear in the first edition, are introduced in the second edition. These people advocated the importance of the line integral expressions for the elastic field of a dislocation loop. There is also added coverage of atomic calculations and new material on advanced anisotropic elastic theory and grain boundary dislocations. However, very little coverage is found in the area of continuous distributions of dislocations developed by K. Kondo, Bilby and Kröner, among others.

This book consists of four parts. Part 1 focuses on the fundamentals of dislocations (elastic theory of dislocations in isotropic continua); Part 2 on effects of crystal structure on dislocations (the Peiels-Nabarro dislocation model, partial dislocations, kinks, and anisotropy of crystals); Part 3 on dislocation-point defect interactions (thermal kinks and jogs, pinning and drag of Cottrell, Snoek, and Suzuki's atmospheres); and Part 4 focuses on groups of dislocations (dislocation models of grain boundaries, dislocation sources, pileups and twinning).

Compared with Nabarro's book (*Theory of Crystal Dislocations*, Oxford 1967), this book provides sufficient detail for the book to be effectively used as an undergraduate text, as well as extended treatments of specific problems to stimulate advanced graduate students and scientists.

Micromechanics of Defects in Solids. By T. Mura. Martinus Nijhoff, The Hague, 1982. pp. x–494. Price $98.00.

REVIEWED BY D. M. BARNETT[6]

Much of what might be termed advances in the mathematical treatment of defects (inclusions, inhomogeneities, dislocations, and cracks) in solids tends to be scattered throughout the journal literature; as a result, the researcher intent on entering this field faces the rather formidable task of deciding on the best way in which to begin learning about the theory of defects. Prior to the appearance of Professor Mura's monograph, *the* single outstanding text available to such a researcher was *Theory of Dislocations* by J. P. Hirth and J. Lothe, now available in its second edition. The Hirth and Lothe book is, in my opinion, a beautiful exposition of great lasting value. Nonetheless, I have long had the feeling that it is more easily digested by one trained in solid state physics or materials science than by one whose primary bent is solid mechanics; in addition, Hirth and Lothe devote very little space to J. D. Eshelby's famous "transformation strain" problem, whose solution and attendent results should be in the "bag of tricks" carried by every Ph.D. materials scientist. Professor Mura's book more than adequately fills both gaps. Over one-third of the book is devoted to the treatment of inclusions and inhomogeneities in isotropic and anisotropic linear elastic solids, and the development of the subject matter should please readers familiar with either solid mechanics or applied mathematics.

The first chapter introduces the notion of eigenstrains and emphasizes in a self-contained way the use of elastic Green's functions to represent the solution to eigenstrain problems. The next three chapters provide a most complete survey of inclusion and inhomogeneity problems and contain a wealth of formulas which should prove most useful to those requiring solutions to this class of problems. Cracks and dislocations in elastic solids receive a reasonably complete treatment in chapters 5 and 6. The final chapter emphasizes the use of techniques and solutions introduced previously to model phenomena of importance to mechanical metallurgists, including work-hardening of dispersion strengthened alloys, stress relaxation via diffusion, and polycrystal plasticity.

In summary, Professor Mura's book may be heartily recommended to those interested in either applying or learning to apply the methods of continuum mechanics to treat defects in the solid state. This monograph could serve as the perfect text for a second-level graduate course with the same title as that of the book.

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Advanced Engineering Analysis. By J. N. Reddy and M. L. Rasmussen. Wiley, New York, 1982. pp. xiv–488. Price $39.95.

REVIEWED BY L. WHEELER[7]

The aim of this book is to present a unified treatment of three topics, namely vector and tensor analysis, functional analysis, and the calculus of variations for an audience of students in engineering and applied science. It is based on class notes used by the authors in teaching seniors and first-year graduate students, and for the most part, its level and style reflect these origins. Exercises are included. They are well chosen and suitably placed.

The subject of functional analysis is important to much of modern science and I believe that a useful purpose is served by bringing it to a wider audience. An initiate to this field faces a rather bland literature which might seem merely to proliferate abstract function spaces. Here the authors have something to offer. They have put together a concise introductory treatment where a student can pick up the basic concepts.

The remaining two parts of the book do not seem to measure up to the part on functional analysis. While the treatment of the calculus of variations benefits slightly from the emphasis placed on methods of approximation and computation, I am disappointed to see it so weakly linked to the functional analysis that precedes it in the book.

A major goal of the vector and tensor part is evidently to ease the student into functional analysis. While it might also be intended to furnish mathematical preliminaries for such subjects as modern continuum mechanics, this purpose is hindered by the notation, level, and style of the presentation. In particular, I fail to see why portions of it are so elementary.

I recommend this book as a course book to those who teach functional analysis and variational methods to students interested in applications. Further, it is written so that students in need of outside reading should find it helpful. It would deserve serious attention as a textbook, but I doubt whether many institutions offer a course to which it is closely suited.

Spacecraft Dynamics. By T. R. Kane, P. W. Likins, and D. A. Levinson. McGraw-Hill, New York, 1982. 436 Pages. Price $49.50.

REVIEWED BY R. L. HUSTON[8]

This book is a welcome addition to the literature on spacecraft dynamics and on dynamics itself. It is basically a textbook, but it will undoubtedly become a reference for engineers and designers as well. Although the book has only

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