

Book reviews

M. Van Dyke, **Perturbation methods in fluid mechanics**, annotated edition. The Parabolic Press, Stanford, California, USA, 1975, xiv + 271 pages, price \$ 7.00 (hardbound).

This is the second, annotated edition of Van Dyke's famous book published originally by Academic Press in 1964. The first edition went out of print a few years ago, and the author now republishes the book himself (as the "Parabolic Press"!) at a modest price. At the same time he has taken the opportunity to bring the book up to date by adding 34 pages of notes keyed to the text, and 150 new references. Also, some minor corrections have been made in the original text.

The notes add very much to the value of the book. There is a note on computer extension of regular perturbations, and several ones on asymptotic matching and matching principles providing a description of various difficulties encountered during the last decade, and giving very useful hints for practical cases. There are also notes on recent developments in high Reynolds number flow about a flat plate (triple deck boundary layer structure), and low Reynolds number flow about a circular cylinder or a sphere.

Together with a few other books, this one remains a very useful and attractively written guide to the practical use of asymptotic perturbation methods. It is certainly a "must" for any student or worker in applied mathematics or fluid dynamics.

H. W. Hoogstraten

K. Böhmer, **Spline-Funktionen, Theorie und Anwendungen**. Teubner-Studienbücher, B. G. Teubner, Stuttgart, 1974, 340 pp., price DM 24.80.

In this book the basic theory of splines is treated in a clear way. The applications in numerical analysis and the list of algol-programs make the book also very useful for practical work. In chapter 1, the cubic spline is introduced and convergence properties are given. Chapter 2 contains background material from the theory of Hilbert spaces, the theory of ordinary linear differential equations and the calculus of finite differences. Sobolev spaces and generalised solutions of linear differential equations are introduced in chapter 3. Chapter 4 provides the basic theory of splines in a Hilbert space and furthermore smoothing splines are discussed. The application of the general theory to Lg-splines can be found in chapter 5, where at the same time the periodic splines and the, for practical applications very important, B-splines are treated. Several methods for the construction of splines are given in chapter 6. Chapter 7 deals with the approximation of linear functionals. In chapter 8, error estimates for interpolating splines are derived. The last four chapters contain applications such as the construction of optimal quadrature formulae, initial value problems, boundary value problems and eigenvalue problems.

E. F. F. Botta