Linear differential operators

Lanczos, Cornelius, 1893- , author

Abstrak

Don't let the title fool you! If you are interested in numerical analysis, applied mathematics, or the solution procedures for differential equations, you will find this book useful. Because of Lanczos' unique style of describing mathematical facts in nonmathematical language, Linear Differential Operators also will be helpful to nonmathematicians interested in applying the methods and techniques described.
Originally published in 1961, this Classics edition continues to be appealing because it describes a large number of techniques still useful today. Although the primary focus is on the analytical theory, concrete cases are cited to forge the link between theory and practice. Considerable manipulative skill in the practice of differential equations is to be developed by solving the 350 problems in the text. The problems are intended as stimulating corollaries linking theory with application and providing the reader with the foundation for tackling more difficult problems.
Lanczos begins with three introductory chapters that explore some of the technical tools needed later in the book, and then goes on to discuss interpolation, harmonic analysis, matrix calculus, the concept of the function space, boundary value problems, and the numerical solution of trajectory problems, among other things. The emphasis is constantly on one question: "What are the basic and characteristic properties of linear differential operators?"
In the author's words, this book is written for those "to whom a problem in ordinary or partial differential equations is not a problem of logical acrobatism, but a problem in the exploration of the physical universe. To get an explicit solution of a given boundary value problem is in this age of large electronic computers no longer a basic question. But of what value is the numerical answer if the scientist does not understand the peculiar analytical properties and idiosyncrasies of the given operator? The author hopes that this book will help in this task by telling something about the manifold aspects of a fascinating field."