

Book review. Alois Kufner, Jan Kadles: Fourier Series

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Alois KUFNER, Jan KADLEC

Fourier Series

ACADEMIA — pp. 438 — 53 ill. — in English — paper covers

The character of the present book reflects the goals set by the authors. The first one is to make the theory and applications of Fourier series accessible to an as wide community of readers as possible. Secondly, an effort was made to present to those readers, who are familiar with the fundamentals of Fourier series, a broader and deeper view in this theory than that encountered in standard textbooks dealing with this topic.

The material covered in the book is divided into two parts. The fundamental part consisting of Chapters 2 to 6 is accessible to readers equipped with a basic knowledge of the differential and integral calculus, and contains approximately all facts needed for solving problems in common practice. However, even in this part the coverage is not restricted only to the theory of trigonometric Fourier series. The authors start from the theory of orthogonal series in a Hilbert space and thus enable the reader to realize the broader relationships and to acquire, for example, at least a crude picture of the theory and applications of orthogonal polynomials. The fundamental part is concluded by a chapter devoted to practical problems concerning the numerical evaluation of Fourier series and Fourier coefficients.

Slightly more exacting is the second part consisting of Chapter 7 and 8. Here, certain deeper theoretical results of the theory of Fourier series are presented not in a systematic and exhaustive manner, but rather by many appropriately selected examples; in addition to it, the basic facts about Fourier transforms are given.

The first chapter has an auxiliary character and reviews some fundamental concepts and propositions from mathematical analysis. In chapter 9 various applications of Fourier series and Fourier transforms are briefly discussed, and Chapter 10 is in essence a survey of Fourier series and Fourier transforms of some frequently encountered functions.

For a better understanding of the present material the text is augmented by many examples and problems to be solved by the reader. The problems, ranging from easy to difficult ones, are chosen so that the reader can himself deepen his knowledge, check his comprehension of the studied facts and also acquire a certain calculation routine.

Contents:

Basic Concepts

Concept of a Fourier Series

Hilbert Space

Some Special Fourier Series in Specific Hilbert Spaces

Calculation of Fourier Series

Approximate Harmonic Analysis

Some Special Criteria for Convergence

Fourier Transforms

Examples of the Application of Fourier Series

Survey of Fourier Series and Fourier Transforms

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