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Nota di contenuto	Fourier Analysis; Contents; Preface; Introduction; 1 Fourier Coefficients and Fourier Series; 1.1 Periodic Functions: Beginning Bits; 1.2 Fourier Coefficients of 2-Periodic Functions; 1.3 More on $P = 2$ ; 1.4 Pointwise Convergence of Fourier Series: A Theorem; 1.5 An Application: Evaluation of Infinite Series; 1.6 Gibbs' Phenomenon; 1.7 Uniform Convergence of Fourier Series: A Theorem; 1.8 Derivatives, Antiderivatives, and Fourier Series; 1.9 Functions of Other Periods $P > 0$ ; 1.10 Amplitude, Phase, and Spectra; 1.11 Functions on Bounded Intervals: Standard Fourier Series 1.12 Other Fourier Series for Functions on Bounded Intervals 2 Fourier Series and Boundary Value Problems; 2.1 Steady State Temperatures and ""the Fourier Method""; 2.2 Linear Operators, Homogeneous Equations, and Superposition; 2.3 Heat Flow in a Bar I: Neumann and Mixed Boundary Conditions; 2.4 Heat Flow in a Bar II: Other Boundary Conditions; 2.5 Cylindrical and Polar Coordinates; 2.6 Spherical Coordinates; 2.7 The Wave Equation I; 2.8 The Wave Equation II: Existence and Uniqueness of Solutions; 2.9 The Wave Equation III:

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2.10 The Wave Equation IV: Temporally Constant Inhomogeneity; 2.11 The Wave Equation V: Temporally Varying Inhomogeneity; 2.12 The Wave Equation VI: Drumming Up Some Interest; 2.13 Triple Fourier Series; 3 L2 Spaces: Optimal Contexts for Fourier Series; 3.1 The Mean Square Norm and the Inner Product on  $C(T)$ ; 3.2 The Vector Space  $L2(T)$ ; 3.3 More on  $L2(T)$ ; the Vector Space  $L1(T)$ ; 3.4 Norm Convergence of Fourier Series: A Theorem; 3.5 More on Integration; 3.6 Orthonormality, Orthonormality, and Fourier Series; 3.7 More on the Inner Product; 3.8 Orthonormal Bases for Product Domains  
3.9 An Application: The Isoperimetric Problem  
3.10 What Is  $L2(T)$ ?; 4 Sturm-Liouville Problems; 4.1 Definitions and Basic Properties; 4.2 Some Boundary Value Problems; 4.3 Bessel Functions I: Bessel's Equation of Order  $n$ ; 4.4 Bessel Functions II: Fourier-Bessel Series; 4.5 Bessel Functions III: Boundary Value Problems; 4.6 Orthogonal Polynomials; 4.7 More on Legendre Polynomials; 5 Convolution and the Delta Function: A Splat and a Spike; 5.1 Convolution: What Is It?; 5.2 Convolution: When Is It Compactly Supported?; 5.3 Convolution: When Is It Bounded and Continuous?  
5.4 Convolution: When Is It Differentiable? 5.5 Convolution: An Example; 5.6 Convolution: When Is It In  $L1(R)$ ? In  $L2(R)$ ?; 5.7 Approximate Identities and the Dirac Delta ""Function""; 6 Fourier Transforms and Fourier Integrals; 6.1 The Fourier Transform on  $L1(R)$ : Basics; 6.2 More on the Fourier Transform on  $L1(R)$ ; 6.3 Low-Impact Fourier Transforms (Integration by Differentiation); 6.4 Fourier Inversion on  $FL1(R)$ ; 6.5 The Fourier Transform and Fourier Inversion on  $L2(R)$ ; 6.6 Fourier Inversion of Piecewise Smooth, Integrable Functions; 6.7 Fourier Cosine and Sine Transforms  
6.8 Multivariable Fourier Transforms and Inversion

### Sommario/riassunto

A reader-friendly, systematic introduction to Fourier analysis. Rich in both theory and application, Fourier Analysis presents a unique and thorough approach to a key topic in advanced calculus. This pioneering resource tells the full story of Fourier analysis, including its history and its impact on the development of modern mathematical analysis, and also discusses essential concepts and today's applications. Written at a rigorous level, yet in an engaging style that does not dilute the material, Fourier Analysis brings two profound aspects of the discipline to the fo