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Nota di contenuto	FOURIER TRANSFORMS; Contents; Preface; Philosophy and Distinctives; Flow of the Book; Suggested Use; Acknowledgments; 1 Review of Prerequisite Mathematics; 1.1 Common notation; 1.2 Vectors in space; 1.3 Complex numbers; 1.4 Matrix algebra; 1.5 Mappings and functions; 1.6 Sinusoidal functions; 1.7 Complex exponentials; 1.8 Geometric series; 1.9 Results from calculus; 1.10 Top 10 ways to avoid errors in calculations; Problems; 2 Vector Spaces; 2.1 Signals and vector spaces; 2.2 Finite-dimensional vector spaces; 2.2.1 Norms and Metrics; 2.2.2 Inner Products 2.2.3 Orthogonal Expansion and Approximation2.3 Infinite-dimensional vector spaces; 2.3.1 Convergent Sequences; 2.3.3 Functions and the Lp Spaces; 2.4 Operators; 2.5 Creating orthonormal bases-the Gram-Schmidt process; 2.6 Summary; Problems; 3 The Discrete Fourier Transform; 3.1 Sinusoidal sequences; 3.2 The Discrete Fourier transform; 3.3 Interpreting the DFT; 3.4 DFT properties and theorems; 3.5 Fast Fourier transform; 3.6 Discrete cosine transform; 3.7 Summary; Problems; 4 The Fourier Series; 4.1 Sinusoids and physical systems; 4.2 Definitions and interpretation 4.3 Convergence of the Fourier series4.4 Fourier series properties and theorems; 4.5 The heat equation; 4.6 The vibrating string; 4.7 Antenna

arrays; 4.8 Computing the Fourier series; 4.9 Discrete time Fourier transform; 4.9.1 Convergence Properties; 4.9.2 Theorems; 4.9.3 Discrete-time Systems; 4.9.4 Computing the DTFT; 4.10 Summary; Problems; 5 The Fourier Transform; 5.1 From Fourier series to Fourier transform; 5.2 Basic properties and some examples; 5.3 Fourier transform theorems; 5.4 Interpreting the Fourier transform; 5.5 Convolution; 5.5.1 Definition and basic properties
5.5.2 Convolution and Linear Systems5.5.3 Correlation; 5.6 More about the Fourier transform; 5.6.1 Fourier inversion in L1; 5.6.2 Fourier Transform in L2; 5.6.3 More about convolution; 5.7 Time-bandwidth relationships; 5.8 Computing the Fourier transform; 5.9 Time-frequency transforms; 5.10 Summary; Problems; 6 Generalized Functions; 6.1 Impulsive signals and spectra; 6.2 The delta function in a nutshell; 6.3 Generalized functions; 6.3.1 Functions and Generalized Functions; 6.3.2 Generalized Functions as Sequences of Functions; 6.3.3 Calculus of Generalized Functions
6.4 Generalized Fourier transform6.4.1 Definition; 6.4.2 Fourier Theorems; 6.5 Sampling theory and Fourier series; 6.5.1 Fourier Series, Again; 6.5.2 Periodic Generalized Functions; 6.5.3 The Sampling Theorem; 6.5.4 Discrete-time Fourier Transform; 6.6 Unifying the Fourier family; 6.6.1 Basis Functions and Orthogonality Relationships; 6.6.2 Sampling and Replication; 6.7 Summary; Problems; 7 Complex Function Theory; 7.1 Complex functions and their visualization; 7.2 Differentiation; 7.3 Analytic functions; 7.4 exp z and functions derived from it; 7.5 log z and functions derived from it
7.5.1 The Logarithm Function

Sommario/riassunto

"Fourier Analysis with Complex Variables explains transform methods and their application to electrical systems from circuits, antennas, and signal processors--ably guiding readers from vector space concepts to the Discrete Fourier Transform (DFT) and the Fourier series. Featuring chapter end summaries of key results, over two hundred examples and four hundred homework problems, MATLAB files, and a Solutions Manual this book is perfect for graduate students in signal processing and communications as well as practicing engineers"--
"Provides the same solid background as classic texts in the field, but with an emphasis on digital and other contemporary applications to signal and image processing"--