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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction: the Problem to be Solved -- Part I Basics -- Basic Fundamentals—What You Need to Know -- Approximation of Functions on the Real Line -- Part II Approximation on the Sphere -- Basic Aspects -- Fourier Analysis -- Spherical Splines -- Spherical Wavelet Analysis -- Spherical Slepian Functions -- Part III Approximation on the 3D Ball -- Orthonormal Bases -- Splines -- Wavelets for Inverse Problems on the 3D Ball -- The Regularized Functional Matching Pursuit (RFMP) -- References -- Index.
Sommario/riassunto	Lectures on Constructive Approximation: Fourier, Spline, and Wavelet Methods on the Real Line, the Sphere, and the Ball focuses on spherical problems as they occur in the geosciences and medical imaging. It comprises the author’s lectures on classical approximation methods based on orthogonal polynomials and selected modern tools such as

splines and wavelets. Methods for approximating functions on the real line are treated first, as they provide the foundations for the methods on the sphere and the ball and are useful for the analysis of time-dependent (spherical) problems. The author then examines the transfer of these spherical methods to problems on the ball, such as the modeling of the Earth’s or the brain’s interior. Specific topics covered include: * the advantages and disadvantages of Fourier, spline, and wavelet methods * theory and numerics of orthogonal polynomials on intervals, spheres, and balls * cubic splines and splines based on reproducing kernels * multiresolution analysis using wavelets and scaling functions This textbook is written for students in mathematics, physics, engineering, and the geosciences who have a basic background in analysis and linear algebra. The work may also be suitable as a self-study resource for researchers in the above-mentioned fields.