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Soggetti	Biomathematics Bioinformatics Mathematics Visualization Mathematical models Manifolds (Mathematics) Complex manifolds Physiological, Cellular and Medical Topics Computational Biology/Bioinformatics Mathematical Modeling and Industrial Mathematics Manifolds and Cell Complexes (incl. Diff.Topology)
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Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	1 Introduction -- 2 Interchanging geometry conventions in 3DEM: Mathematical context for the development of standards -- 3 Fully automated particle selection and verification in single-particle cryo-EM -- 4 Quantitative analysis in iterative classification schemes for cryo-EM applications -- 5 High-resolution cryo-EM structure of the Trypanosoma brucei ribosome of a case study -- 6 Computational methods for electron tomography of influenza virus -- 7 Reconstruction from microscopic projections with defocus-gradient and attenuation effects -- 8 Soft X-ray tomography imaging for biological samples -- 9 Using component trees to explore biological structures.

Sommario/riassunto

Approaches to the recovery of three-dimensional information on a biological object, which are often formulated or implemented initially in an intuitive way, are concisely described here based on physical models of the object and the image-formation process. Both three-dimensional electron microscopy and X-ray tomography can be captured in the same mathematical framework, leading to closely-related computational approaches, but the methodologies differ in detail and hence pose different challenges. The editors of this volume, Gabor T. Herman and Joachim Frank, are experts in the respective methodologies and present research at the forefront of biological imaging and structural biology. Computational Methods for Three-Dimensional Microscopy Reconstruction will serve as a useful resource for scholars interested in the development of computational methods for structural biology and cell biology, particularly in the area of 3D imaging and modeling.