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Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	1. Proteins: Ssp DnaE Intein -- 2. Protein Crystals: Molecular to Continuum Level Models based on Crystal Plasticity Theory -- 3. Molecular Motors: Cooperative Phenomena of Multiple Molecular Motors. – 4. Biofilament dynamics: Line-to-rod-level Descriptions -- 5. Primary Cilia: Multi-Scale Structures that integrate Biomechanics and Mechanobiology. – 6. Biological Scaffolding: Reduced-Order Network Models -- 7. Transport phenomena: Computational models for convective and diffusive transport in capillaries and tissue -- 8. Tendons and ligaments: Current state and future directions. – 9. Arteries: Mechanics, Mechanobiology, and the Need for a New Class of

Models -- 10. Mitral Valves: A computational framework. – 11. Biological systems: Multiscale modeling based on Mixture Theory.

Sommario/riassunto

Presenting a state-of-the-art overview of theoretical and computational models that link characteristic biomechanical phenomena, this book provides guidelines and examples for creating multiscale models in representative systems and organisms. It develops the reader's understanding of and intuition for multiscale phenomena in biomechanics and mechanobiology, and introduces a mathematical framework and computational techniques paramount to creating predictive multiscale models. Biomechanics involves the study of the interactions of physical forces with biological systems at all scales – including molecular, cellular, tissue and organ scales. The emerging field of mechanobiology focuses on the way that cells produce and respond to mechanical forces – bridging the science of mechanics with the disciplines of genetics and molecular biology. Linking disparate spatial and temporal scales using computational techniques is emerging as a key concept in investigating some of the complex problems underlying these disciplines. Providing an invaluable field manual for graduate students and researchers of theoretical and computational modelling in biology, this book is also intended for readers interested in biomedical engineering, applied mechanics and mathematical biology.