

INTRODUCTORY BIOPHYSICS

PERSPECTIVES ON THE LIVING STATE

JAMES CLAYCOMB • JONATHAN QUOC P. TRAN

Designed for biology, physics, and medical students, *Introductory Biophysics: Perspectives on the Living State* provides a comprehensive overview of the complex subject of biological physics. The accompanying CD-ROM, which contains MATLAB® examples and the fully functional student version of QuickField™ 5.7, allows the student to perform biophysical simulations and modify the textbook example files. The text includes many computer models and simulations of biophysical phenomena such as thermodynamics, astrobiology, the response of living cells to external fields, chaos in population dynamics, numerical models of evolution, electrical circuit models of cell suspensions, gap junctions, and neuronal action potentials. Using this text, students will be able to perform biophysical simulations within hours.

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KEY FEATURES

- Designed to prepare students for practical applications of physics that they will encounter in the fields of biology and medicine
- Using MATLAB and QuickField, computer models allow for hands-on investigation of problems relevant to biophysics, such as modeling biophysical processes and dynamics
- Includes cutting-edge material in complexity, space biology, and astrobiology
- Includes a CD-ROM with biophysical lab simulations, example files, 4-color figures from the text, articles from experts in the field, and the fully functional student version of QuickField 5.7

MATLAB examples on the CD-ROM and in the text include:

- The Hodgkin-Huxley equations
- The FitzHugh-Nagumo model of action potentials
- Fractal structures in biology
- Chaos in population dynamics
- The cellular automaton model—the game of life
- Pattern formation in reaction-diffusion systems

QuickField tutorials and examples on the CD-ROM include:

- Calculation of currents in biological tissue
- Cells under electrical stimulation
- Induced membrane potentials
- Heat transfer and analysis of stress in biomaterials



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