Keener, James; **Sneyd, James**

Mathematical physiology. (English) Zbl 0913.92009

Interdisciplinary Applied Mathematics. 8. New York, NY: Springer. xix, 766 p. DM 139,00; öS 1.015,00; sFr 126,50; £53,50; $ 69,95 (1998).

This book is in the series "Interdisciplinary Applied Mathematics", because it can be argued that of all the biological sciences, physiology is the one in which mathematics has played the greatest role. This book describes work that lies on the border between mathematics and physiology. It is truly an interdisciplinary text, which will be appreciated by physiologists interested in theoretical approaches to their subject, as well as by mathematicians interested in learning new areas of application.

The book is divided into two parts, the first dealing with the fundamental principles of cell physiology, and the second with the physiology of systems. After an introduction to basic biochemistry and enzyme reactions, we can find a discussion of various aspects of cell physiology, including the problem of volume control, the membrane potential, ionic flow through channels, and excitability. Chapter 5 is devoted to calcium dynamics, emphasizing the two important ways that calcium is released from stores, while cells that exhibit electrical bursting are the subject of Chapter 6.

The book is not organized around mathematical techniques. The most mathematical sections arise in the discussion of signaling in two- and three-dimensional media. It needs partial differential equations. This is a very important book in "Mathematical Biology".

Reviewer: T.Postelnicu (Bucureşti)

MSC:

92C30	Physiology (general)
92-02	Research exposition (monographs, survey articles) pertaining to biology
92C40	Biochemistry, molecular biology
92C45	Kinetics in biochemical problems (pharmacokinetics, enzyme kinetics, etc.)

Keywords:

cell physiology; physiology of systems; biochemistry; enzyme reactions; volume control; membrane potential; ionic flow; excitability; calcium dynamics

Full Text: DOI