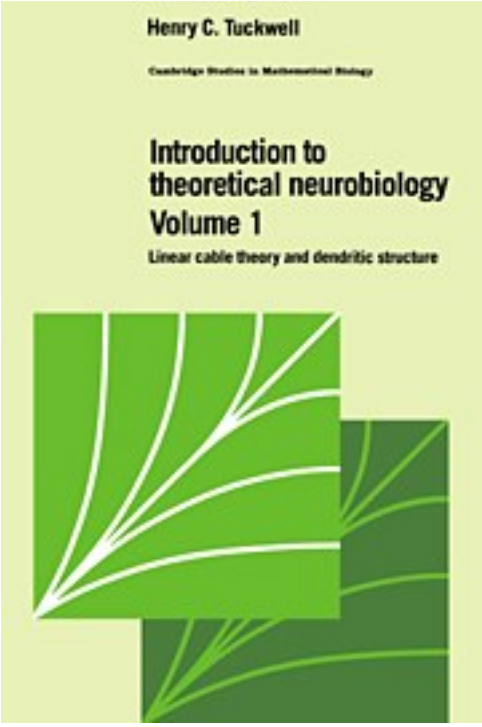
Introduction to Theoretical Neurobiology



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The human brain contains billions of nerve cells whose activity plays a critical role in the way we behave, feel, perceive, and think. This two-volume set explains the basic properties of a neuron - an electrically active nerve cell - and develops mathematical theories for the way neurons respond to the various stimuli they receive. Volume 1 contains descriptions and analyses of the principal mathematical models that have been developed for neurons in the past thirty years. It provides a brief review of the basic neuroanatomical and neurophysiological facts that will form the focus of the mathematical treatment. Tuckwell discusses the mathematical theories, beginning with the theory of membrane potentials. He then goes on to treat the Lapicque model,

linear cable theory, and time-dependent solutions of the cable equations. He concludes with a description of Rall's model nerve cell. Because the level of mathematics increases steadily upward from Chapter Two, some familiarity with differential equations and linear algebra is desirable.

作者介绍:

目录:

Introduction to Theoretical Neurobiology_下载链接1_

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