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| | Soggetti | Statistical physics |
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| | | Physiological, Cellular and Medical Topics |
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| | Livello bibliografico | Monografia |
| | Note generali | Description based upon print version of record. |
| | Nota di bibliografia | Includes bibliographical references at the end of each chapters and index. |
| | Nota di contenuto | MathematicalMethods of Signal Processing in Neuroscience -- Brief Tour of Wavelet Theory -- Analysis of Single Neuron Recordings -- Classification of Neuronal Spikes from Extracellular Recordings -- Wavelet Approach to the Study of Rhythmic Neuronal Activity -- Time–Frequency Analysis of EEG: From Theory to Practice -- Automatic Diagnostics and Processing of EEG -- Conclusion -- Index. |
| | Sommario/riassunto | This book examines theoretical and applied aspects of wavelet analysis in neurophysics, describing in detail different practical applications of |

the wavelet theory in the areas of neurodynamics and neurophysiology and providing a review of fundamental work that has been carried out in these fields over the last decade. Chapters 1 and 2 introduce and review the relevant foundations of neurophysics and wavelet theory, respectively, pointing on one hand to the various current challenges in neuroscience and introducing on the other the mathematical techniques of the wavelet transform in its two variants (discrete and continuous) as a powerful and versatile tool for investigating the relevant neuronal dynamics. Chapter 3 then analyzes results from examining individual neuron dynamics and intracellular processes. The principles for recognizing neuronal spikes from extracellular recordings and the advantages of using wavelets to address these issues are described and combined with approaches based on wavelet neural networks (chapter 4). The features of time-frequency organization of EEG signals are then extensively discussed, from theory to practical applications (chapters 5 and 6). Lastly, the technical details of automatic diagnostics and processing of EEG signals using wavelets are examined (chapter 7). The book will be a useful resource for neurophysiologists and physicists familiar with nonlinear dynamical systems and data processing, as well as for gradua te students specializing in the corresponding areas.