

1. Record Nr.	UNINA9910458608003321
Autore	Bretschneider Franklin <1947->
Titolo	Introduction to electrophysiological methods and instrumentation [[electronic resource] /] / Franklin Bretschneider, Jan R. de Weille
Pubbl/distr/stampa	Amsterdam, : Elsevier/ Academic Press, c2006
ISBN	1-280-64144-4 9786610641444 0-08-046224-3
Edizione	[1st ed.]
Descrizione fisica	1 online resource (267 p.)
Altri autori (Persone)	De WeilleJan R
Disciplina	612.01427 612.813 616.807547
Soggetti	Electrophysiology - Equipment and supplies Electronics Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front cover; Title page; Copyright page; Table of contents; Preface; 1 Electricity; Electrical Quantities; Electric Charge, Current and Potential; Resistance; Capacitance; Magnetism; Self-Inductance; Direct and Alternating Current; Frequency; Reactance; Current and Voltage Sources; Components, Unwanted Properties; Unwanted Properties, Impedance; Cables; Circuits, Schematics, Kirchoff's Laws; Composition of Similar Components: Attenuators; Practical Voltage Sources and Current Sources; Voltage and Current Measurement; Composition of Unequal Components: Filters; Integration and Differentiation LC Filters2 Electronics; Active Elements; Vacuum Tubes and Semiconductors; Semiconductor Devices; Diodes and Transistors; Other Semiconductor Types; Amplifiers, Gain, Decibels and Saturation; Gain; Bandwidth; Input and Output Impedances; Maximum Signal Strength, Distortion; Noise, Hum Interference and Grounding; Differential Amplifiers, Block Diagrams; Operational Amplifiers, Feedback; Electronic Filters; Electrophysiological Preamplifiers; Amplifier for Extracellular Recording; Amplifier for Intracellular Recording; Patch-

Clamp Amplifier; Two-Electrode Voltage-Clamp Amplifier  
Measurement of Membrane Capacitance in Voltage-Clamp Recording of Secretory Events; Power Supplies and Signal Sources; Electronic Voltmeters; Electrometers; The Cathode Ray Oscilloscope; LCD Screen Oscilloscopes; Important Properties of Oscilloscopes; Digital Electronics, Logic; A/D and D/A Conversions; Computers; 3 Electrochemistry; Introduction, Properties of Electrolytes; Electrolytes; The Metal/Electrolyte Interface; Capacitance of Polarized Electrodes; Faradaic Processes; Practical Electrodes; Electrochemical Cells, Measuring Electrodes; The Silver/Silver Chloride Electrode Non-Faradaic Processes; Electrokinetic Processes; Liquid Junction Potentials; Membrane Potentials; Derivation of the Equilibrium Potential; The Reversal Potential; Ion Selectivity; Electrodes Sensitive to pH and Other Ions; Electrodes: Practical Aspects; The Glass Micropipette; Patch Electrodes; The Semi-Permeable Patch; Ground Electrodes; Volume Conduction: Electric Fields in Electrolyte Solutions; Homogeneous Electric Field; Monopole Field; Dipole Field; 4 Signal Analysis; Introduction; Analysis of Analogue Potentials; Systems Analysis; Convolution; The Laplace Transform  
The Fourier Transform; Odd and Even Functions; Linearity; Analogue-to-Digital and Digital-to-Analogue Conversions; Signal Windowing; Digital Signal Processing; Signal Averaging; Autocorrelation; Crosscorrelation; The Discrete Fourier Transform; The Detection of Signals of Known Shape; Digital Filters; Fourier Filters and Non-Causal Filters; Non-Linear Systems Analysis; The Formal Method: Wiener Kernel Analysis; The Informal Method: Output Shape Analysis; The Importance of Non-Linearity; Analysis of Action Potential Signals; Population Spike and Gross Activity; Recording from the Skin Surface  
The Electrocardiogram

---

### Sommario/riassunto

Introduction to Electrophysiological Methods and Instrumentation covers all topics of interest to electrophysiologists, neuroscientists and neurophysiologists, from the reliable penetration of cells, the behaviour and function of the equipment, to the mathematical tools available for analysing data. It discusses the pros and cons of techniques and methods used in electrophysiology and how to avoid their pitfalls. Particularly in an era where high quality off-the-shelf solutions are readily available, it is important for the electrophysiologist to understand how his or her equipment

---