



Bioelectromagnetism: Principles and Applications of Bioelectric and Biomagnetic Fields

By Jaakko Malmivuo, Robert Plonsey

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This book provides a general view of bioelectromagnetism and describes it as an independent discipline. It begins with an historical account of the many innovations and innovators on whose work the field rests. This is accompanied by a discussion of both the theories and experiments which were contributed to the development of the field. The physiological origin of bioelectric and biomagnetic signal is discussed in detail. The sensitivity in a given measurement situation, the energy distribution in stimulation with the same electrodes, and the measurement of impedance are related and described by the electrode lead field. It is shown that, based on the reciprocity theorem, these are identical and further, that these procedures apply equally well for biomagnetic considerations. The difference between corresponding bioelectric and biomagnetic methods is discussed. The book shows, that all subfields of bioelectromagnetism obey the same basic laws and they are closely tied together through the principle of reciprocity. Thus the book helps the reader to understand the properties of existing bioelectric and biomagnetic measurements and stimulation methods and to design new systems. The book includes about 300 carefully drawn illustrations and 500 references. It can be used as a textbook for third or fourth year university students and as a source of reference.

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"The book...is comprehensive and well-organized, and nicely edited and produced."--Engineering in Medicine and Biology

About the Author

Robert Plonsey is at Duke University.

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