



Bioimpedance and Bioelectricity Basics, Second Edition

By Orjan G. Martinsen, Sverre Grimnes

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Bioelectricity (or bioelectromagnetism) relates to the study of biological electrical currents, and bioimpedance deals with the measurement of electrical conductivity. They are intimately linked to biomedical engineering, with major significance for development of novel medical devices, as well as the study of biological rhythms. This completely updated new edition remains the most comprehensive reference tool for this intricate, interdisciplinary field.

The authors, both internationally recognized experts in the field, have thoroughly revised the entire text. It remains the only such work that discusses in detail dielectric and electrochemical aspects, as well as electrical engineering concepts of network theory. The highly effective, easy to follow organization has been retained, with new discussion of state-of-the-art advances in finite element analysis, endogenous sources, control theory, tissue electrical properties, and invasive measurements. There are two all new chapters on bioelectricity, along with an introduction to Geselowitz theory, the Maxwell basis of bioimpedance, and multivariate analysis as an alternative.

- * Increased emphasis on bioelectricity and potential clinical applications
- * Two all new chapters dealing with electrical properties of passive and excitable tissue
- * Expanded discussion of finite element modelling and a broad range of applications
- * Provides a complete 'all in one' reference source for a multidisciplinary, complex field
- * Includes many additional figures and all improved, newly drawn illustrations throughout

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Bibliography

- Sales Rank: #2542768 in Books
- Published on: 2008-04-21
- Original language: English
- Number of items: 1
- Dimensions: 9.21" h x 1.21" w x 7.74" l, 2.27 pounds
- Binding: Hardcover
- 488 pages

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Editorial Review

Review

...an excellent reference for students and researchers in those areas that make use of the concepts of bioimpedance and bioelectricity ... (it provides), in a single work, an opportunity ...to understand and compare the various methods of bioimpedance and bioelectricity measurement, as well as the several models used to describe and interpret the electrical behavior of biological tissues.

Review of the First Edition, Annals of Biomedical Engineering

About the Author

Ørjan G. Martinsen received his M.Sc. and PhD in electronic engineering from the Department of Physics at the University of Oslo, with both of his theses focusing on the electrical properties of human skin. Since completing his PhD in 1995, Martinsen has held a permanent position in the same department and currently leads the electronics research section and is Coordinator of the Oslo Bioimpedance Group. As well as his work at the university, Martinsen also holds a part time research position in the Department of Clinical and Biomedical Engineering at Oslo University Hospital, his main research interest being electrical bioimpedance.

With Sverre Grimnes he is the founding editor-in-chief of the Journal of Electrical Bioimpedance (www.bioimpedance.net).

Sverre Grimnes graduated in 1963 as an electronic engineer from the Technical University of Trondheim. He spent four years at SI, Oslo followed by a year at Sorbonne in Paris before moving to the University of Oslo's Department of Chemistry. From 1973-2001 he was Head of the Department of Biomedical and Clinical Engineering at Rikshospitalet and since 1984 has also been Professor at the Department of Physics at the University of Oslo.

His research interests include electrical and physiological properties of human skin, patient electrical safety, and bioimpedance basic theory and instrumentation.

Professor Grimnes authored a hugely successful Norwegian book series on Medical Technology and has been awarded the Herman P Schwan Award and the Kings Gold Medal of Merit.

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