

Second Edition

Biomedical Signal Analysis

Rangaraj M. Rangayyan

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Biomedical Signal Analysis Rangayyan

By RANGARAJ M. RANGAYYAN



Biomedical Signal Analysis Rangayyan:

Biomedical Signal Analysis Rangaraj M. Rangayyan, 2015-04-24 The book will help assist a reader in the development of techniques for analysis of biomedical signals and computer aided diagnoses with a pedagogical examination of basic and advanced topics accompanied by over 350 figures and illustrations Wide range of filtering techniques presented to address various applications 800 mathematical expressions and equations Practical questions problems and laboratory exercises Includes fractals and chaos theory with biomedical applications *Biomedical Signal Analysis* Rangaraj M.

Rangayyan, Sridhar Krishnan, 2024-02-19 *Biomedical Signal Analysis* Comprehensive resource covering recent developments applications of current interest and advanced techniques for biomedical signal analysis *Biomedical Signal Analysis* provides extensive insight into digital signal processing techniques for filtering identification characterization classification and analysis of biomedical signals with the aim of computer aided diagnosis taking a unique approach by presenting case studies encountered in the authors research work Each chapter begins with the statement of a biomedical signal problem followed by a selection of real life case studies and illustrations with the associated signals Signal processing modeling or analysis techniques are then presented starting with relatively simple textbook methods followed by more sophisticated research informed approaches Each chapter concludes with solutions to practical applications Illustrations of real life biomedical signals and their derivatives are included throughout The third edition expands on essential background material and advanced topics without altering the underlying pedagogical approach and philosophy of the successful first and second editions The book is enhanced by a large number of study questions and laboratory exercises as well as an online repository with solutions to problems and data files for laboratory work and projects *Biomedical Signal Analysis* provides theoretical and practical information on The origin and characteristics of several biomedical signals Analysis of concurrent coupled and correlated processes with applications in monitoring of sleep apnea Filtering for removal of artifacts random noise structured noise and physiological interference in signals generated by stationary nonstationary and cyclostationary processes Detection and characterization of events covering methods for QRS detection identification of heart sounds and detection of the dicrotic notch Analysis of waveshape and waveform complexity Interpretation and analysis of biomedical signals in the frequency domain Mathematical electrical mechanical and physiological modeling of biomedical signals and systems Sophisticated analysis of nonstationary multicomponent and multisource signals using wavelets time frequency representations signal decomposition and dictionary learning methods Pattern classification and computer aided diagnosis *Biomedical Signal Analysis* is an ideal learning resource for senior undergraduate and graduate engineering students Introductory sections on signals systems and transforms make this book accessible to students in disciplines other than electrical engineering **Biomedical Signal Analysis** Rangaraj M. Rangayyan, 2002 The development of techniques to analyze biomedical signals such as electro cardiograms has dramatically affected countless lives by making possible

improved noninvasive diagnosis online monitoring of critically ill patients and rehabilitation and sensory aids for the handicapped Rangaraj Rangayyan supplies a practical hands on field guide to this constantly evolving technology in Biomedical Signal Analysis focusing on the diagnostic challenges that medical professionals continue to face Dr Rangayyan applies a problem solving approach to his study Each chapter begins with the statement of a different biomedical signal problem followed by a selection of real life case studies and the associated signals Signal processing modeling or analysis techniques are then presented starting with relatively simple textbook methods followed by more sophisticated research approaches The chapter concludes with one or more application solutions illustrations of real life biomedical signals and their derivatives are included throughout Among the topics addressed are Concurrent coupled and correlated processes Filtering for removal of artifacts Event detection and characterization Frequency domain characterization Modeling biomedical systems Analysis of nonstationary signals Pattern classification and diagnostic decision The chapters also present a number of laboratory exercises study questions and problems to facilitate preparation for class examinations and practical applications Biomedical Signal Analysis provides a definitive resource for upper level under graduate and graduate engineering students as well as for practicing engineers computer scientists information technologists medical physicists and data processing specialists An authoritative assessment of the problems and applications of biomedical signals rooted in practical case studies

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