בס"ד

Haim Azhari- List of Publications

Refereed Papers in Professional Journals

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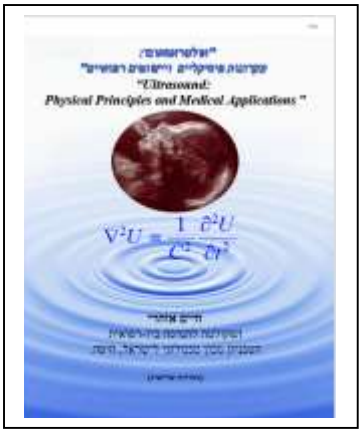
Text Books

2006 "Ultrasound: Physical Principles and Medical Applications"

" אולטראסאונד: עקרונות פיסיקליים ויישומים רפואיים"

by: Haim Azhari

Synopsis: This book provides the basic physical and engineering principles of ultrasound in the context of medical applications. The book starts with a basic description of waves and their mathematical description. It then analyzes the propagation of mechanical waves in rods, strings, fluids and solids. Attenuation reflection and transmission are then described. Then, the design principles of acoustic lenses and mirrors are outlined followed by the description of ultrasonic transducers and the calculation of their acoustic fields. Three chapters are then dedicated to the various imaging techniques (including also Doppler measurements). And finally safety and therapeutic applications are discussed.



Soft cover: 301 pages,

Publisher: Michlol Inc.

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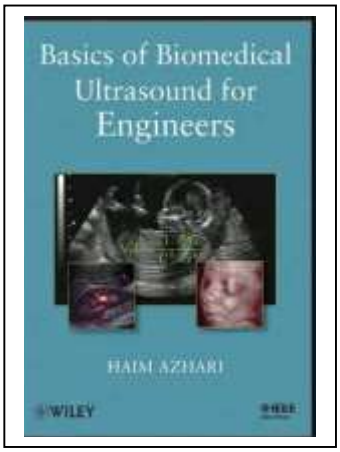
2010 "Basics of Biomedical Ultrasound for Engineers"

by: Haim Azhari



*Synopsis**:** Basics of Biomedical Ultrasound for Engineers is a structured textbook that leads the novice through the field in a clear, step-by-step manner. Based on twenty years of teaching experience, it begins with the most basic definitions of waves, proceeds to ultrasound in fluids and solids, explains the principles of wave attenuation and reflection, then introduces to the reader the principles of focusing devices, ultrasonic transducers and acoustic fields, and then delves into integrative applications of ultrasound in conventional and advanced medical imaging techniques (including Doppler imaging) and therapeutic ultrasound. Demonstrative medical applications are interleaved within the text and exemplary questions with solutions are provided on every chapter. Readers will come*

away with the basic toolkit of knowledge they need to successfully use ultrasound in biomedicine and conduct research.

Hardcover: 371 pages

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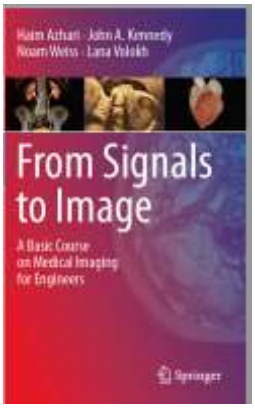
2020 "From Signals to Image"

***by**: **Haim Azhari,** John A Kennedy, Noam Weiss, Lana Volokh*



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Synopsis: This textbook, intended for advanced undergraduate and graduate students, is an introduction to the physical and mathematical principles used in clinical medical imaging. The first two chapters introduce basic concepts and useful terms used in medical imaging and the tools implemented in image reconstruction, while the following chapters cover an array of topics such as: physics of x-rays and their implementation in planar and computed tomography (CT) imaging;nuclear medicine imaging and the methods of forming functional planar and single photon emission computed tomography (SPECT) images and Clinical imaging using positron emitters as radiotracers. The book also discusses the principles of MRI pulse sequencing and signal generation, gradient fields, and the methodologies implemented for image formation, form flow imaging and magnetic resonance angiography and the basic physics of acoustic waves, the different acquisition modes used in medical ultrasound, and the methodologies implemented for image formation and for flow imaging using the Doppler Effect.

By the end of the book, readers will know what is expected from a medical image, will comprehend the issues involved in producing and assessing the quality of a medical image, will be able to conceptually implement this knowledge in the development of a new imaging modality, and will be able to write basic algorithms for image reconstruction. Knowledge of calculus, linear algebra, regular and partial differential equations, and a familiarity with the Fourier transform and it applications is expected, along with fluency with computer programming. The book contains exercises, homework problems, and sample exam questions that are exemplary of the main concepts and formulae students would encounter in a clinical setting.

Chapters in Books

- **Azhari H**, Beyar R, Barta E, Dinnar U, Sideman S: 3-D simulation of left ventricular contraction combining myocardial mechanics and electrical activation. In: Activation, Metabolism and Perfusion of the Heart, Sideman S and Beyar R, editors. Martinus Nijhoff Publishers, Dordrecht, 1987, pp. 313-339.

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