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Titolo	From Signals to Image : A Basic Course on Medical Imaging for Engineers // by Haim Azhari, John A. Kennedy, Noam Weiss, Lana Volokh
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ISBN	3-030-35326-5
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (472 pages) : illustrations
Disciplina	616.0754
Soggetti	Biomedical engineering Signal processing Image processing Speech processing systems Radiology Medical physics Radiation Biomedical Engineering and Bioengineering Signal, Image and Speech Processing Imaging / Radiology Medical and Radiation Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Introduction -- Basic Principles of Image Reconstruction -- X-ray Imaging and Computed Tomography -- Nuclear Medicine: Planar and SPECT Imaging -- Positron Emission Tomography (PET) -- Magnetic Resonance Imaging (MRI) -- Ultrasound Imaging -- Hybrid and Novel Methods -- Appendix -- Exemplary Solved Problems and Exams.
Sommario/riassunto	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 PET 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. Teaches the basic principles of medical imaging needed for understanding and conducting research and development in the field Emphasizes practical calculations for the design and evaluation of medical imaging devices Contains exemplary exercises, homework problems, and sample exam questions .

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