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Nota di contenuto	Front Cover; Diagnostic Ultrasound Imaging: Inside Out; Copyright Page; Contents; Preface; Acknowledgments; 1 Introduction; 1.1 Introduction; 1.1.1 Early Beginnings; 1.1.2 Sonar; 1.2 Echo Ranging of the Body; 1.3 Ultrasound Portrait Photographers; 1.4 Ultrasound Cinematographers; 1.5 Modern Ultrasound Imaging Developments; 1.6 Enabling Technologies for Ultrasound Imaging; 1.7 Ultrasound Imaging Safety; 1.8 Ultrasound and Other Diagnostic Imaging Modalities; 1.8.1 Imaging Modalities Compared; 1.8.2 Ultrasound; 1.8.3 Plane X-rays; 1.8.4 Computed Tomography Imaging 1.8.5 Magnetic Resonance ImagingMagnetic Resonance Imaging Applications; 1.8.6 Magnetoencephalography; 1.8.7 Positron Emission Tomography; 1.9 Contrast Agents; 1.9.1 Computed Tomography Agents; 1.9.2 Magnetic Resonance Imaging Adgents; 1.9.3 Ultrasound Agents; 1.10 Comparison of Imaging Modalities; 1.10.1 Image Fusion; 1.10.2 Multi-wave and Interactive Imaging; 1.11 Conclusion; References; Bibliography; 2 Overview; 2.1 Introduction; 2.2 Fourier Transform; 2.2.1 Introduction to the Fourier Transform; 2.2.2 Fourier Transform Relationships; 2.3 Building Blocks 2.3.1 Time and Frequency Building Blocks2.3.2 Space Wave Number Building Block; Spatial Transforms; Spatial Transform of a Line Source; Spatial Frequency Building Blocks; 2.4 Central Diagram; References; 3

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	Acoustic Wave Propagation; 3.1 Introduction to Waves; 3.2 Plane Waves in Liquids and Solids; 3.2.1 Introduction; 3.2.2 Wave Equations for Fluids; 3.2.3 One-dimensional Wave Hitting a Boundary; 3.2.4 ABCD Matrices; 3.2.5 Oblique Waves at a Liquid-Liquid Boundary; 3.3 Elastic Waves in Solids; 3.3.1 Types of Waves; 3.3.2 Equivalent Networks for Waves; 3.3.3 Waves at a Fluid-Solid Boundary 3.4 Elastic Wave Equations3.5 Conclusion; References; Bibliography; 4 Attenuation; 4.1 Losses in Tissues; 4.1.1 Losses in Exponential Terms and in Decibels; 4.1.2 Tissue Data; 4.2 Losses in Both Frequency and Time Domains; 4.2.1 The Material Transfer Function; 4.2.2 The Material Impulse Response Function; 4.3 Tissue Models; 4.3.1 Introduction; 4.3.2 The Time Causal Model; 4.4 Pulses in Lossy Media; 4.4.1 Scaling of the Material Impulse Response Function; 4.4.2 Pulse Propagation Interactive Effects in Time and Frequency; 4.4.3 Pulse Echo Propagation 4.5 Modified Hooke's Laws and Tissue Models for Viscoelastic Media4. 5.1 Voigt Model; 4.5.2 Time Causal Model; 4.5.3 Maxwell Model; 4.5.4 Thermoviscous Relaxation Model; 4.5.5 Multiple Relaxation Model; 4.5.6 Zener Model; 4.6 Wave Equations for Tissues; 4.6.1 Voigt Model Wave Equation; 4.6.2 Time Causal Model Wave Equation; 4.6.3 Time Causal Model Wave Equations in Fractional Calculus Form; 4.7 Discussion; 4.7.1 First Principles; 4.7.2 Power Law Wave Equation Implementations; 4.7.3 Transient Solutions for Power Law Media
Sommario/riassunto	This book provides a unified description of the physical principles of ultrasound imaging, signal processing, systems and measurements. This comprehensive reference is a core resource for both graduate students and engineers in medical ultrasound research. With continuing rapid technological development of ultrasound in medical diagnosis, it is a critical subject for biomedical engineers, clinical and healthcare engineers and practitioners, medical physicists, and related professionals in the fields of signal and image processing. It contains new and updated chapters on 15 topics an