Diagnostic Ultrasound
Physics and Equipment

Second Edition
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Second edition

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Preface to the second edition

The aims and intended audience of this second edition remain unchanged from the first edition. The aim is to provide the underpinning knowledge of physics and instrumentation needed in order to practise ultrasound in a clinical setting. The book is primarily aimed at sonographers and clinical users in general, and will also serve as a first textbook for physicists and engineers. The text concentrates on explanations of principles which underpin the clinical use of ultrasound systems. The book contains relatively few equations and even fewer derivations. In the last 7 years a number of techniques which existed in embryo form in 2002 have become available on commercial ultrasound systems, and are used in a sufficient number of hospitals to justify inclusion in this book. There are additional chapters dedicated to 3D ultrasound, contrast agents and elastography. The other chapters have been updated to include developments in technology, quality assurance and safety. We hope that this second edition of ‘Diagnostic Ultrasound Physics and Equipment’ will meet the needs of sonographers, physicists and engineers in their training and practice.

Peter Hoskins
Kevin Martin
Abigail Thrush
Autumn 2009
Preface to the first edition

This book is an introductory text in the physics and instrumentation of medical ultrasound imaging. The level is appropriate for sonographers and clinical users in general. This will also serve as a first textbook for physicists and engineers. The text concentrates on explanations of principles which underpin the clinical use of ultrasound systems, with explanations following a ‘need to know’ philosophy. Consequently, complex techniques, such as Doppler frequency estimation using FFT and 2D autocorrelation, are described in terms of their function, but not in terms of their detailed signal processing. The book contains relatively few equations and even fewer derivations. The scope of the book reflects ultrasound instrumentation as it is used at the time of submission to the publishers. Techniques which are still emerging, such as tissue Doppler imaging (TDI) and contrast agents, are covered in a single chapter at the end of the book. Techniques which are even further from commercial implementation, such as vector Doppler, are not covered. We hope this book fills the gap in the market that we perceive from discussions with our clinical colleagues, that of a text which is up to date and at an appropriate level.

Peter Hoskins
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