
Preface

This book has grown out of lecture notes for a course on mathematical methods in biomedical imaging at Ecole Polytechnique.

Biomedical imaging is a fascinating research area to applied mathematicians. It is quite a hot topic that appeals to many students. Challenging imaging problems arise and they often trigger the investigation of fundamental problems in various branches of mathematics (including inverse problems, PDEs, harmonic analysis, complex analysis, numerical analysis, optimization, image analysis). Many applied mathematicians have experienced a great feeling of accomplishment when they saw their work having a real impact on medical and clinical decision making.

In this book, we underscore the importance of mathematical aspects of emerging biomedical imaging. We acknowledge that biomedical technology has already had success in performing imaging in many different contexts, however in this book we highlight the most recent developments in emerging, non standard, techniques that are not yet established as standard imaging tools. The contents of this book introduce the reader to the basic mathematical concepts of biomathematical imaging and lay the ground for advanced issues in innovative techniques in the field.

This book may be used for a graduate-level course in applied mathematics and should help prepare the reader for a deeper understanding of research areas in biomedical imaging. Some background knowledge of PDEs is assumed.

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