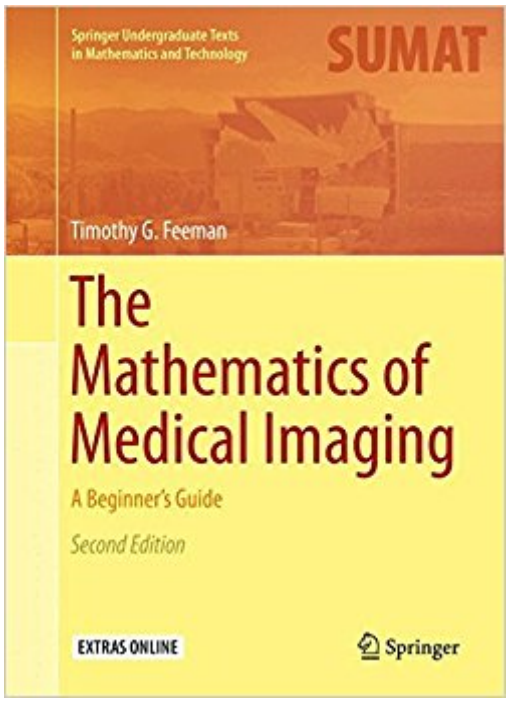
The Mathematics Of Medical Imaging: A BeginnerÃ¢â‚¬â„¢s Guide (Springer Undergraduate Texts In Mathematics And Technology)



Synopsis

The basic mathematics of computerized tomography, the CT scan,Ã Â are aptly presented for an audience of undergraduates in mathematics and engineering. Assuming no prior background in advanced mathematical analysis, topics such as the Fourier transform, sampling, and discrete approximation algorithms are introduced from scratch and are developed within the context of medical imaging. A chapter on magnetic resonance imaging focuses on manipulation of the Bloch equation, the system of differential equations that is the foundation of this important technology. Extending the ideas of the acclaimed first edition, new material has been adeed to render an even more accessible textbook for course usage. This edition includes new discussions of the Radon transform, the Dirac delta function and its role in X-ray imaging, KacmarzÃ¢â ¬â„¢s method and least squares approximation, spectral filtering, and more.Ã Â Copious examples and exercises, new computer-based exercises, and additional graphics have been added to further delineate concepts. The use of technology has been revamped throughout with the incorporation of the open source programming environment R to illustrate examples and composition of graphics. All R code is available as extra source material on SpringerLink.From the reviews of the first edition:Ã¢â ¬Å“This book is valuable, for it addresses with care and rigor the relevance of a variety of mathematical topics to a real-world problem. Ã¢â ¬Â¦This book is well written. It serves its purpose of focusing a variety of mathematical topics onto a real-world application that is in its essence mathematics.Ã¢â ¬Â• Ã¢â ¬â œThe Journal of Nuclear Medicine, Vol. 51 (12), December, 2010Ã¢â ¬Å“This new book by Timothy Feeman, truly intended to be a beginnerÃ¢â ¬â„¢s guide, makes the subject accessible to undergraduates with a working knowledge of multivariable calculus and some experience with vectors and matrix methods. Ã¢â ¬Â¦author handles the material with clarity and graceÃ¢â ¬Â¦Ã¢â ¬Â• Ã¢â ¬â œThe Mathematical Association of America, February, 2010Ã Â

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Customer Reviews

Ã¢â ¬Å“The text is concise, lucidly written and coherently structured. It is also self-contained and easily accessible to any undergraduate student having a solid command of mathematics at the level of some introductory courses in algebra and analysis. The code written in R is a genuine asset of high practical and educational value. Overall, this textbook provides good, highly informative, and useful material to students and all of those with interest in medical imaging.Ã¢â ¬Â• (Witold Pedrycz, zbMATH 1351.92002, 2017)Ã¢â ¬Å“I believe that the book is a useful starting point for undergraduate students from mathematics, computer science, and related fields who want to learn how CT works; it also provides interesting reading for people from medical areas who want to find out the technical and mathematical background of the tools that they use.Ã¢â ¬Â• (Kai Diethelm, Computing Reviews, computingreviews.com, May, 2016)

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exactly what i was looking for! and for an amazing price.

This is a short and self-contained introduction to the mathematics of tomography reconstruction, with specially focus to the CT reconstruction.The book is clear, didactic and easy to read. It has with a nice collection of proposed problems at the end of the chapter.In my option, the book has three fails 1. There is no appendix with detailed the solution of the exercises. This feature is always appreciated for me, although many of the problems are easy, they are direct applications of the theory, they always gives the opportunities to discuss interesting features or advance something that will be explaining in the next chapters. 2. The chapter about complex numbers is unnecessary; because I think that everyone who reads this book will has knowledge in this topic.A good compromise would be to suppress this chapter and adding an appendix with detailed solutions of the problems 3. the book would improve with an introduction to algorithms and codes in some high level language like MatLab or Mapple. This point is mention inside the book, but it should be more explicit.I recommend this book for anyone who wants a quick introduction (a first step) to the mathematics behind CT reconstruction.

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