Mathematical Foundations of Imaging, Tomography and Wavefield Inversion

Anthony J. Devaney

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Mathematical Foundations of Imaging, Tomography and Wavefield Inversion Anthony J. Devaney Inverse problems are of interest and importance across many branches of physics, mathematics, engineering and medical imaging. In this text, the foundations of imaging and wavefield inversion are presented in a clear and systematic way. The necessary theory is gradually developed throughout the book, progressing from simple wave equation based models to vector wave models. By combining theory with numerous MATLAB based examples, the author promotes a complete understanding of the material and establishes a basis for real world applications. Key topics of discussion include the derivation of solutions to the inhomogeneous and homogeneous Helmholtz equations using Green function techniques; the propagation and scattering of waves in homogeneous and inhomogeneous backgrounds; and the concept of field time reversal. Bridging the gap between mathematics and physics, this multidisciplinary book will appeal to graduate students and researchers alike. Additional resources including MATLAB codes and solutions are available online at www.cambridge.org/9780521119740.

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