Colton, David; **Kress, Rainer**
Inverse acoustic and electromagnetic scattering theory. 2nd ed. (English) ‖Zbl 0893.35138‖
Applied Mathematical Sciences. 93. Berlin: Springer. xii, 334 p. (1998).

The first edition of this well-known and appreciated text, extremely valuable for both, students and researchers, appeared in 1992 (for a review cf. Zbl 0760.35053).

The book consists of the following 10 Chapters: 1) Introduction, 2) The Helmholtz equation, 3) Direct acoustic obstacle scattering, 4) Ill-posed problems, 5) Inverse acoustic obstacle scattering, 6) The Maxwell equations, 7) Inverse electromagnetic obstacle scattering, 8) Acoustic waves in an inhomogeneous medium, 9) Electromagnetic waves in an inhomogeneous medium, 10) The inverse medium problem.

Concerning the improvements, compared to the first edition, let the reviewer cite from the authors' Preface: "In addition to making minor corrections and additional comments in the text and updating the references, we have added new sections on: Newton's method for solving the inverse obstacle problem (Section 5.3), the spectral theory of the far field operator (Section 8.4), a proof of the uniqueness of the solution to the inverse medium problem for acoustic waves (Section 10.2), and a method for determining the support of an inhomogeneous medium from far field data by solving a linear integral equation of the first kind (Section 10.7). We hope that this second edition will attract new readers to the beautiful and intriguing field of inverse scattering".

Reviewer: G.Bruckner (Berlin)

MSC:

35R30	Inverse problems for PDEs
35P25	Scattering theory for PDEs
35-02	Research exposition (monographs, survey articles) pertaining to partial differential equations
35J05	Laplace operator, Helmholtz equation (reduced wave equation), Poisson equation
45A05	Linear integral equations
78A45	Diffraction, scattering
65R30	Numerical methods for ill-posed problems for integral equations
76Q05	Hydro- and aero-acoustics

Cited in **4** Reviews
Cited in **626** Documents

Keywords:

Helmholtz equation; acoustic obstacle scattering; Maxwell equations; electromagnetic obstacle scattering; waves in an inhomogeneous medium; inverse medium problem; Newton's method; uniqueness; far field data; linear integral equation of the first kind