

Contents

Preface	ix
1 Inverse Scattering Theory	1
1.1 The Helmholtz Equation	1
1.2 The Scattering Problem for Inhomogeneous Isotropic Media . . .	7
1.3 Ill-Posed Problems	20
1.4 The Scattering Problem for Anisotropic Media	24
2 The Determination of the Support of Inhomogeneous Media	35
2.1 The Linear Sampling Method (LSM)	36
2.2 A Generalized Version of LSM (GLSM)	42
2.3 The Inf-Criterion	52
2.4 The Factorization Method	54
2.5 Link between Sampling Methods	63
2.6 Application of Sampling Methods to Anisotropic Media	69
3 The Interior Transmission Problem	79
3.1 Solvability of the Interior Transmission Problem for Isotropic Media	80
3.2 Solvability of the Interior Transmission Problem for Anisotropic Media	109
4 The Existence of Transmission Eigenvalues	125
4.1 Analytical Tools	126
4.2 Existence of Transmission Eigenvalues for Isotropic Media	130
4.3 Existence of Transmission Eigenvalues for Anisotropic Media . .	151
4.4 The Determination of Transmission Eigenvalues from Far Field Data	164
5 Inverse Spectral Problems for Transmission Eigenvalues	173
5.1 Spherically Stratified Media with Spherically Symmetric Eigen- functions	173
5.2 Spherically Stratified Media with All Eigenvalues	182
Bibliography	185
Index	193