1.	Record Nr.	UNINA9910483884403321
	Autore	Kirsch Andreas <1953->
	Titolo	An introduction to the mathematical theory of inverse problems / / Andreas Kirsch
	Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , 2021
	ISBN	3-030-63343-8
	Edizione	[Third edition.]
	Descrizione fisica	1 online resource (XVII, 400 p. 13 illus.)
	Collana	Applied Mathematical Sciences ; ; Volume 120
	Disciplina	515.357
	Soggetti	Inverse problems (Differential equations)
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Introduction and Basic Concepts -- Regularization Theory for Equations of the First Kind -- Regularization by Discretization -- Nonlinear Inverse Problems -- Inverse Eigenvalue Problems -- An Inverse Problem in Electrical Impedance Tomography -- An Inverse Scattering Problem -- Basic Facts from Functional Analysis -- References -- Index.
	Sommario/riassunto	This graduate-level textbook introduces the reader to the area of inverse problems, vital to many fields including geophysical exploration, system identification, nondestructive testing, and ultrasonic tomography. It aims to expose the basic notions and difficulties encountered with ill-posed problems, analyzing basic properties of regularization methods for ill-posed problems via several simple analytical and numerical examples. The book also presents three special nonlinear inverse problems in detail: the inverse spectral problem, the inverse problem of electrical impedance tomography (EIT), and the inverse scattering problem. The corresponding direct problems are studied with respect to existence, uniqueness, and continuous dependence on parameters. Ultimately, the text discusses theoretical results as well as numerical procedures for the inverse problems, including many exercises and illustrations to complement coursework in mathematics and engineering. This updated text includes a new chapter on the theory of nonlinear inverse problems in response to the field's growing popularity, as well as a new section on the interior transmission eigenvalue problem which complements the Sturm-Liouville problem and which has received great attention since the