

1. Record Nr.	UNISA996466389103316
Autore	Hasanoglu Alemdar Hasanov
Titolo	Introduction to inverse problems for differential equations // Alemdar Hasanov Hasanoglu, Vladimir G. Romanov
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-79427-X
Edizione	[Second edition.]
Descrizione fisica	1 online resource (XVII, 515 p. 28 illus., 5 illus. in color.)
Disciplina	515.357
Soggetti	Inverse problems (Differential equations) Computer science - Mathematics Problemes inversos (Equacions diferencials) Equacions en derivades parcials Anàlisi numèrica Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction: Ill-Posedness of Inverse Problems for Differential and Integral Equations -- PART I. INTRODUCTION TO INVERSE PROBLEMS: 1. Functional Analysis Background of Ill-Posed Problems -- 2. Inverse Source Problems With Final Overdetermination -- PART II. INVERSE PROBLEMS FOR DIFFERENTIAL EQUATIONS: 3. Inverse Problems for Hyperbolic Equations -- 4. One-dimensional Inverse Problems for Electrodynamics Equations -- 5. Inverse Problems for Parabolic Equations -- 6. Inverse Problems for Elliptic Equations -- 7. Inverse Problems for the Stationary Transport Equations -- 8. The Inverse Kinematic Problem -- Appendix A: Invertibility of Linear Operators -- Appendix B: Some Estimates For One-dimensional Parabolic Equation -- Bibliography -- Index.
Sommario/riassunto	This book presents a systematic exposition of the main ideas and methods in treating inverse problems for PDEs arising in basic mathematical models, though it makes no claim to being exhaustive. Mathematical models of most physical phenomena are governed by initial and boundary value problems for PDEs, and inverse problems

governed by these equations arise naturally in nearly all branches of science and engineering. The book's content, especially in the Introduction and Part I, is self-contained and is intended to also be accessible for beginning graduate students, whose mathematical background includes only basic courses in advanced calculus, PDEs and functional analysis. Further, the book can be used as the backbone for a lecture course on inverse and ill-posed problems for partial differential equations. In turn, the second part of the book consists of six nearly-independent chapters. The choice of these chapters was motivated by the fact that the inverse coefficient and source problems considered here are based on the basic and commonly used mathematical models governed by PDEs. These chapters describe not only these inverse problems, but also main inversion methods and techniques. Since the most distinctive features of any inverse problems related to PDEs are hidden in the properties of the corresponding solutions to direct problems, special attention is paid to the investigation of these properties. For the second edition, the authors have added two new chapters focusing on real-world applications of inverse problems arising in wave and vibration phenomena. They have also revised the whole text of the first edition.
