Introduction To Integral Equations With Applications Gbv

Numerical Analysis for Electromagnetic Integral EquationsLinear Integral EquationsAn Introduction to the Study of Integral EquationsApproximation Methods for Solutions of Differential and Integral EquationsVolterra Integral EquationsIntegral EquationsAbel Integral EquationsIntegral Equations and Their ApplicationsThe Classical Theory of Integral EquationsA First Course in Integral EquationsIntegral Equation Methods for Electromagnetic and Elastic WavesDifferential and Integral EquationsNumerical Solution of Integral EquationsIntroduction to Nonlinear Differential and Integral EquationsApplied Singular Integral EquationsLinear Integral EquationsMultidimensional Singular Integrals and Integral EquationsSingular Integral EquationsAn Introduction to the Study of Integral EquationsIntegral EquationsFirst Course In Integral Equations, A: Solutions Manual (Second Edition)Integral EquationsIntroduction to Integral Equations with ApplicationsComputational Methods for Integral EquationsA First Course in Integral EquationsIntroduction to Nonlinear Differential and Integral EquationsSingular Integral EquationsLinear and Nonlinear Integral EquationsIntegral EquationsIntroduction to Integral Equations with ApplicationsLectures on Integral EquationsNonlinear Volterra Integral EquationsTechniques of Functional Analysis for Differential and Integral EquationsIntroduction to Integral Equations with ApplicationsHandbook of Integral EquationsIntroduction to Integral CalculusThe Numerical Solution of Integral Equations of the Second KindStrongly Elliptic Systems and Boundary Integral EquationsIntegral EquationsIntegral Equations: A Practical Treatment, from Spectral Theory to Applications

Numerical Analysis for Electromagnetic Integral Equations

Linear Integral Equations

Multidimensional Singular Integrals and Integral Equations presents the results of the theory of multidimensional singular integrals and of equations containing such integrals. Emphasis is on singular integrals taken over Euclidean space or in the closed manifold of Liapounov and equations containing such integrals. This volume is comprised of eight chapters and begins with an overview of some theorems on linear equations in Banach spaces, followed by a discussion on the simplest properties of multidimensional singular integrals. Subsequent chapters deal with compounding of singular integrals; properties of the symbol, with particular reference to Fourier transform of a kernel and the symbol of a singular operator; singular integrals in Lp spaces; and singular integral equations. The differentiation of integrals with a weak singularity is also considered, along with the rule for the multiplication of the symbols in the general case. The final chapter describes several applications of multidimensional singular integral equations to boundary problems in mathematical physics. This book will be of interest to mathematicians and students of mathematics.

An Introduction to the Study of Integral Equations

Approximation Methods for Solutions of Differential and Integral Equations

The book aims to tackle the solution of integral equations using a blend of abstract 'structural' results and more direct, down-to-earth mathematics.

Volterra Integral Equations

This book provides an extensive introduction to the numerical solution of a large class of integral equations.

Integral Equations

This textbook provides a readable account of techniques for numerical solutions.

Abel Integral Equations

An accessible introduction to the fundamentals of calculusneeded to solve current problems in engineering and the physicalsciences I ntegration is an important function of calculus, andIntroduction to Integral Calculus combines fundamental conceptswith scientific problems to develop intuition and skills forsolving mathematical problems related to engineering and thephysical sciences. The authors provide a solid introduction tointegral calculus and feature applications of integration,solutions of differential equations, and evaluation methods. Withlogical organization coupled with clear, simple explanations, theauthors reinforce new concepts to progressively build skills andknowledge, and numerous real-world examples as well as intriguingapplications help readers to better understand the connectionsbetween the theory of calculus and practical problem solving. The first six chapters address the prerequisites needed tounderstand the principles of integral calculus and explore suchtopics as anti-derivatives, methods of converting integrals intostandard form, and the concept of area. Next, the authors reviewnumerous methods and applications of integral calculus,including: Mastering and applying the first and second fundamental theoremsof calculus to compute definite integrals Defining the natural logarithmic function using calculus Evaluating definite integrals Calculating plane areas bounded by curves Applying basic concepts of differential equations to solveordinary differential equations With this book as their guide, readers quickly learn to solve abroad range of current problems throughout the physical sciencesand engineering that can only be solved with calculus. Examplesthroughout provide practical guidance, and practice problems andexercises allow for further development and fine-tuning of variouscalculus skills. Introduction to Integral Calculus is an excellentbook for upper-undergraduate calculus courses and is also an idealreference for students and professionals who would like to gain afurther understanding of the use of calculus to solve problems in asimplified manner.

Integral Equations and Their Applications

This book is the result of 20 years of investigations carried out by the author and his colleagues in order to bring closer and, to a certain extent, synthesize a number of well-known results, ideas and methods from the theory of function approximation, theory of differential and integral equations and numerical analysis. The book opens with an introduction on the theory of function approximation and is followed by a new approach to the Fredholm integral equations to the second kind. Several chapters are devoted to the construction of new methods for the effective approximation of solutions of several important integral, and ordinary and partial differential equations. In addition, new general results on the theory of linear differential equations with one regular singular point, as well as applications of the various new methods are discussed.

The Classical Theory of Integral Equations

This second edition integrates the newly developed methods with classical techniques to give both modern and powerful approaches for solving integral equations. It provides a comprehensive treatment of linear and nonlinear Fredholm and Volterra integral equations of the first and second kinds. The materials are presented in an accessible and straightforward manner to readers, particularly those from non-mathematics backgrounds. Numerous well-explained applications and examples as well as practical exercises are presented to guide readers through the text. Selected applications from mathematics, science and engineering are investigated by using the newly developed methods. This volume consists of nine chapters, pedagogically organized, with six chapters devoted to linear integral equations, two chapters on nonlinear integral equations, and the last chapter on applications. It is intended for scholars and researchers, and can be used for advanced undergraduate and graduate students in applied mathematics, science and engineering. Click here for solutions manual.

A First Course in Integral Equations

Topics covered include differential equations of the 1st order, the Riccati equation and existence theorems, 2nd order equations, elliptic integrals and functions, nonlinear mechanics, nonlinear integral equations, more. Includes 137 problems.

Integral Equation Methods for Electromagnetic and Elastic Waves

This is the first book on solved problems in integral equations. It is prepared to accompany the author's textbook "Introduction to Integral Equations with Applications - 2nd ed., Wiley & Sons, Inc., 1999", which is the first complete & applicable undergraduate text on the subject. The manual contains very detailed solutions to more than half the problems in the text besides statements & solutions to additional exercises, that are covered to serve illustrating the introductory material in the more advanced books. As for the accompanied text, both books model a variety of real world problems & are accessible to undergraduate students & interested readers with preparation in basic calculus & differential equation courses. Librarians will find this package invaluable for their readers with the need to learn about integral equations. There is no doubt that it will also fill a very proper space in college book stores as the real introductory & complete books on the subject. The package discusses & illustrates in full details, the most basic exact, approximate & numerical solutions to the basic integral equations. Coming in September, 1999. To order: Telephone (315)265-2755, (315)265-1005, Fax (315)265-2755, e-mail:solnman@hotmail.com, jerria@clarkson.edu. Send $29.95 plus $2.95 for shipping & handling in the United States & Canada & $4.95 abroad (in US currency - major credit cards accepted) to: Attn. S.A. Jerri, 69 Leroy Street, Potsdam, MY 13676, USA. See the web site: http://www.clarkson.edu/-jerria/solnman.

Differential and Integral Equations

Differential & integral equations involve important mathematical techniques, & as such will be encountered by mathematicians, & physical & social scientists, in their undergraduate courses. This text provides a clear, comprehensive guide to first- & second- order ordinary & partial differential equations.

Numerical Solution of Integral Equations

From the reviews of the First Edition: "Extremely clear, self-contained text . . . offers to a wide class of readers the theoretical foundations and the modern numerical methods of the theory of linear integral equations."-Revue Roumaine de Mathematiques Pures et Appliquées. Abdul Jerri has revised his highly applied book to make it even more useful for scientists and engineers, as well as mathematicians. Covering the fundamental ideas and techniques at a level accessible to anyone with a solid undergraduate background in calculus and differential equations, Dr. Jerri clearly demonstrates how to use integral equations to solve real-world engineering and physics problems. This edition provides precise guidelines to the basic methods of solutions, details more varied numerical methods, and substantially boosts the total of practical examples and exercises. Plus, it features added emphasis on the basic theorems for the existence and uniqueness of solutions of integral equations and points out the interrelation between differentiation and integration. Other features include: * A new section on integral equations in higher dimensions. * An improved presentation of the Laplace and Fourier transforms. * A new detailed section for Fredholm integral equations of the first kind. * A new chapter covering the basic higher quadrature numerical integration rules. * A concise introduction to linear and nonlinear integral equations. * Clear examples of singular integral equations and their solutions. * A student's solutions manual available directly from the author.

Introduction to Nonlinear Differential and Integral Equations

The second edition of A First Course in Integral Equations integrates the newly developed methods with classical techniques to give modern and robust approaches for solving integral equations. The manual accompanying this edition contains solutions to all exercises with complete step-by-step details. To interested readers trying to master the concepts and powerful techniques, this manual is highly useful, focusing on the readers' needs and expectations. It contains the same notations used in the textbook, and the solutions are self-explanatory. It is intended for scholars and researchers, and can be used for advanced undergraduate and graduate students in applied mathematics, science and engineering.

Applied Singular Integral Equations

The theory of integral equations has been an active research field for many years and is based on analysis, function theory, and functional analysis. On the other hand, integral equations are of practical interest because of the «boundary integral equation method», which transforms partial differential equations on a domain into integral equations over its boundary. This book grew out of a series of lectures given by the author at the Ruhr-Universitat Bochum and the Christian-Albrecht-Universitat zu Kiel to students of mathematics. The contents of the first six chapters correspond to an intensive lecture course of four hours per week for a semester. Readers of the book require background from analysis and the foundations of numeri cal mathematics. Knowledge of functional analysis is helpful, but to begin with some basic facts about Banach and Hilbert spaces are sufficient. The theoretical part of this book is reduced to a minimum; in Chapters 2, 4, and 5 more importance is attached to the numerical treatment of the integral equations than to their theory. Important parts of functional analysis (e. g. , the Riesz-Schauder theory) are presented without proof. We expect the reader either to be already familiar with functional analysis or to become motivated by the practical examples given here to read a book about this topic. We recall that also from a historical point of view, functional analysis was initially stimulated by the investigation of integral equations.

Linear Integral Equations

In many fields of application of mathematics, progress is crucially dependent on the good flow of information between (i) theoretical mathematicians looking for applications, (ii) mathematicians working in applications in need of theory, and (iii) scientists and engineers applying mathematical models and methods. The intention of this book is to stimulate this flow of information. In the first three chapters (accessible to third year students of mathematics and physics and to mathematically interested engineers) applications of Abel integral equations are surveyed broadly including determination of potentials, stereology, seismic travel times, spectroscopy, optical fibres. In subsequent chapters (requiring some background in functional analysis) mapping properties of Abel integral operators and their relation to other integral transforms in various function spaces are investi- gated, questions of existence and uniqueness of solutions of linear and nonlinear Abel integral equations are treated, and for equations of the first kind problems of ill-posedness are discussed. Finally, some numerical methods are described. In the theoretical parts, emphasis is put on the aspects relevant to applications.

Multidimensional Singular Integrals and Integral Equations

This concise and classic volume presents the main results of integral equation theory as consequences of the theory of operators on Banach and Hilbert spaces. In addition, it offers a brief account of Fredholm's original approach. The self-contained treatment requires only some familiarity with elementary real variable theory, including the elements of Lebesgue integration, and is suitable for advanced undergraduates and graduate students of mathematics. Other material discusses applications to second order linear differential equations, and a final chapter uses Fourier integral techniques to investigate certain singular integral equations of interest for physical applications as well as for their own sake. A helpful index concludes the text.

Singular Integral Equations

Abdul Jerri has revised his highly applied book to make it even more useful for scientists and engineers, as well as mathematicians. Covering the fundamental ideas and techniques at a level accessible to anyone with a solid undergraduate background in calculus and differential equations, Dr. Jerri clearly demonstrates how to use integral equations to solve real-world engineering and physics problems. This edition provides precise guidelines to the basic methods of solutions, details more varied numerical methods, and substantially boosts the total of practical examples and exercises. Plus, it features added emphasis on the basic theorems for the existence and uniqueness of solutions of integral equations and points out the interrelation between differentiation and integration.

An Introduction to the Study of Integral Equations

Techniques of Functional Analysis for Differential and Integral Equations describes a variety of powerful and modern tools from mathematical analysis, for graduate study and further research in ordinary differential equations, integral equations and partial differential equations. Knowledge of these techniques is particularly useful as preparation for graduate courses and PhD research in differential equations and numerical analysis, and more specialized topics such as fluid dynamics and control theory. Striking a balance between mathematical depth and accessibility, proofs involving more technical aspects of measure and integration theory are avoided, but clear statements and precise alternative references are given . The work provides many examples and exercises drawn from the literature. Provides an introduction to mathematical techniques widely used in applied mathematics and needed for advanced research in ordinary and partial differential equations, integral equations, numerical analysis, fluid dynamics and other areas Establishes the advanced background needed for sophisticated literature review and research in differential equations and integral equations Suitable for use as a textbook for a two semester graduate level course for M.S. and Ph.D. students in Mathematics and Applied Mathematics

Integral Equations

Many physical problems that are usually solved by differential equation techniques can be solved more effectively by integral equation methods. This work focuses exclusively on singular integral equations and on the distributional solutions of these equations. A large number of beautiful mathematical concepts are required to find such solutions, which in tum, can be applied to a wide variety of scientific fields - potential theory, me chanics, fluid dynamics, scattering of acoustic, electromagnetic and earth quake waves, statistics, and population dynamics, to cite just several. An integral equation is said to be singular if the kernel is singular within the range of integration, or if one or both limits of integration are infinite. The singular integral equations that we have studied extensively in this book are of the following type. In these equations f (x) is a given function and g(y) is the unknown function. 1. The Abel equation x x) = l g (y) d 0

First Course In Integral Equations, A: Solutions Manual (Second Edition)

Integral Equation Methods for Electromagnetic and Elastic Waves is an outgrowth of several years of work. There have been no recent books on integral equation methods. There are books written on integral equations, but either they have been around for a while, or they were written by mathematicians. Much of the knowledge in integral equation methods still resides in journal papers. With this book, important relevant knowledge for integral equations are consolidated in one place and researchers need only read the pertinent chapters in this book to gain important knowledge needed for integral equation research. Also, learning the fundamentals of linear elastic wave theory does not require a quantum leap for electromagnetic practitioners.

Integral Equations

In 1979, I edited Volume 18 in this series: Solution Methods for Integral Equations: Theory and Applications. Since that time, there has been an explosive growth in all aspects of the numerical solution of integral equations. By my estimate over 2000 papers on this subject have been published in the last decade, and more than 60 books on theory and applications have appeared. In particular, as can be seen in many of the chapters in this book, integral equation techniques are playing an increas ingly important role in the solution of many scientific and engineering problems. For instance, the boundary element method discussed by Atkinson in Chapter 1 is becoming an equal partner with finite element and finite difference techniques for solving many types of partial differential equations. Obviously, in one volume it would be impossible to present a complete picture of what has taken place in this area during the past ten years. Consequently, we have chosen a number of subjects in which significant advances have been made that we feel have not been covered in depth in other books. For instance, ten years ago the theory of the numerical solution of Cauchy singular equations was in its infancy. Today, as shown by Golberg and Elliott in Chapters 5 and 6, the theory of polynomial approximations is essentially complete, although many details of practical implementation remain to be worked out.

Introduction to Integral Equations with Applications

Computational Methods for Integral Equations

This book offers a comprehensive introduction to the theory of linear and nonlinear Volterra integral equations. It includes applications and an extensive bibliography.

A First Course in Integral Equations

Authoritative, well-written treatment of extremely useful mathematical tool with wide applications. Topics include Volterra Equations, Fredholm Equations, Symmetric Kernels and Orthogonal Systems of Functions, more. Advanced undergraduate to graduate level. Exercises. Bibliography.

Introduction to Nonlinear Differential and Integral Equations

Linear and Nonlinear Integral Equations: Methods and Applications is a self-contained book divided into two parts. Part I offers a comprehensive and systematic treatment of linear integral equations of the first and second kinds. The text brings together newly developed methods to reinforce and complement the existing procedures for solving linear integral equations. The Volterra integral and integro-differential equations, the Fredholm integral and integro-differential equations, the Volterra-Fredholm integral equations, singular and weakly singular integral equations, and systems of these equations, are handled in this part by using many different computational schemes. Selected worked-through examples and exercises will guide readers through the text. Part II provides an extensive exposition on the nonlinear integral equations and their varied applications, presenting in an accessible manner a systematic treatment of ill-posed Fredholm problems, bifurcation points, and singular points. Selected applications are also investigated by using the powerful Padé approximants. This book is intended for scholars and researchers in the fields of physics, applied mathematics and engineering. It can also be used as a text for advanced undergraduate and graduate students in applied mathematics, science and engineering, and related fields. Dr. Abdul-Majid Wazwaz is a Professor of Mathematics at Saint Xavier University in Chicago, Illinois, USA.

Singular Integral Equations

Unparalleled in scope compared to the literature currently available, the Handbook of Integral Equations, Second Edition contains over 2,500 integral equations with solutions as well as analytical and numerical methods for solving linear and nonlinear equations. It explores Volterra, Fredholm, Wiener–Hopf, Hammerstein, Uryson, and other equations that arise in mathematics, physics, engineering, the sciences, and economics. With 300 additional pages, this edition covers much more material than its predecessor. New to the Second Edition • New material on Volterra, Fredholm, singular, hypersingular, dual, and nonlinear integral equations, integral transforms, and special functions • More than 400 new equations with exact solutions • New chapters on mixed multidimensional equations and methods of integral equations for ODEs and PDEs • Additional examples for illustrative purposes To accommodate different mathematical backgrounds, the authors avoid wherever possible the use of special terminology, outline some of the methods in a schematic, simplified manner, and arrange the material in increasing order of complexity. The book can be used as a database of test problems for numerical and approximate methods for solving linear and nonlinear integral equations.

Linear and Nonlinear Integral Equations

This unique volume is the first book on integral equation-based methods that combines quantitative formulas for predicting numerical simulation accuracy together with rigorous error estimates and results for dozens of actual electromagnetics and wave propagation problems. You get the latest insights on accuracy-improving methods like regularization and error-increasing effects such as edge singularities and resonance, along with full details on how to determine mesh density, choice of basis functions, and other parameters needed to optimize any numerical simulation.

Integral Equations

This classic work is now available in an unabridged paperback edition. Hochstatdt's concise treatment of integral equations represents the best compromise between the detailed classical approach and the faster functional analytic approach, while developing the most desirable features of each. The seven chapters present an introduction to integral equations, elementary techniques, the theory of compact operators, applications to boundary value problems in more than dimension, a complete treatment of numerous transform techniques, a development of the classical Fredholm technique, and application of the Schauder fixed point theorem to nonlinear equations.

Introduction to Integral Equations with Applications

The Classical Theory of Integral Equations is a thorough, concise, and rigorous treatment of the essential aspects of the theory of integral equations. The book provides the background and insight necessary to facilitate a complete understanding of the fundamental results in the field. With a firm foundation for the theory in their grasp, students will be well prepared and motivated for further study. Included in the presentation are: A section entitled Tools of the Trade at the beginning of each chapter, providing necessary background information for comprehension of the results presented in that chapter; Thorough discussions of the analytical methods used to solve many types of integral equations; An introduction to the numerical methods that are commonly used to produce approximate solutions to integral equations; Over 80 illustrative examples that are explained in meticulous detail; Nearly 300 exercises specifically constructed to enhance the understanding of both routine and challenging concepts; Guides to Computation to assist the student with particularly complicated algorithmic procedures. This unique textbook offers a comprehensive and balanced treatment of material needed for a general understanding of the theory of integral equations by using only the mathematical background that a typical undergraduate senior should have. The self-contained book will serve as a valuable resource for advanced undergraduate and beginning graduate-level students as well as for independent study. Scientists and engineers who are working in the field will also find this text to be user friendly and informative.

Lectures on Integral Equations

This 2000 book provided the first detailed exposition of the mathematical theory of boundary integral equations of the first kind on non-smooth domains.

Nonlinear Volterra Integral Equations

This second edition of Linear Integral Equations continues the emphasis that the first edition placed on applications. Indeed, many more examples have been added throughout the text. Significant new material has been added in Chapters 6 and 8. For instance, in Chapter 8 we have included the solutions of the Cauchy type integral equations on the real line. Also, there is a section on integral equations with a logarithmic kernel. The bibliography at the end of the book has been exteded and brought up to date. I wish to thank Professor B.K. Sachdeva who has checked the revised man uscript and has suggested many improvements. Last but not least, I am grateful to the editor and staff of Birkhauser for inviting me to prepare this new edition and for their support in preparing it for publication. RamP Kanwal CHAYfERl Introduction 1.1. Definition An integral equation is an equation in which an unknown function appears under one or more integral signs Naturally, in such an equation there can occur other terms as well. For example, for a ~ s ~ b; a :(t :(b, the equations (1.1.1) f(s) = ib K(s, t)g(t)dt, g(s) = f(s) + ib K(s, t)g(t)dt, (1.1.2) g(s) = ib K(s, t)[g(t)fdt, (1.1.3) where the function g(s) is the unknown function and all the other functions are known, are integral equations. These functions may be complex-valued functions of the real variables s and t.

Techniques of Functional Analysis for Differential and Integral Equations

Introduction to Integral Equations with Applications

The book is devoted to varieties of linear singular integral equations, with special emphasis on their methods of solution. It introduces the singular integral equations and their applications to researchers as well as graduate students of this fascinating and growing branch of applied mathematics.

Handbook of Integral Equations

This book presents the subject of integral equations in an accessible manner for a variety of applications. Emphasis is placed on understanding the subject while avoiding the abstract and compact theorems. A distinctive feature of the book is that it introduces the recent powerful and reliable developments in this field, which are not covered in traditional texts. The newly developed decomposition method, the series solution method and the direct computation method are thoroughly implemented, which allows the topic to be far more accessible. The book also includes some of the traditional techniques for comparison.Using the newly developed methods, the author successfully handles Fredholm and Volterra integral equations, singular integral equations, integro-differential equations and nonlinear integral equations, with promising results for linear and nonlinear models. Many examples are given to introduce the material in a clear and thorough fashion. In addition, many exercises are provided to build confidence, ease and skill in using the new methods.This book may be used as a text for advanced undergraduates and graduate students in mathematics and scientific areas, and as a work of reference for research study of differential equations and numerical analysis.

Introduction to Integral Calculus

The book deals with linear integral equations, that is, equations involving an unknown function which appears under the integral sign and contains topics such as Abel's integral equation, Volterra integral equations, Fredholm integral integral equations, singular and nonlinear integral equations, orthogonal systems of functions, Green's function as a symmetric kernel of the integral equations.

The Numerical Solution of Integral Equations of the Second Kind

The result of the author's fascination with the mathematical beauty of integral equations, this book combines theory, applications, and numerical methods, and covers each of these fields with the same weight. In order to make the book accessible to mathematicians, physicists, and engineers alike, the author has made it as self-contained as possible, requiring only a solid foundation in differential and integral calculus. The functional analysis which is necessary for an adequate treatment of the theory and the numerical solution of integral equations is developed within the book itself. Problems are included at the end of each chapter.

Strongly Elliptic Systems and Boundary Integral Equations

This high-level treatment considers one-dimensional singular integral equations involving Cauchy principal values, covering Hölder condition, Hilbert and Riemann-Hilbert problems, Dirichlet problems, inversion formulas for arcs, more. 1992 edition.

Integral Equations

This text begins with simple examples of a variety of integral equations and the methods of their solution, and progresses to become gradually more abstract and encompass discussions of Hilbert space. 1977 edition.

Integral Equations: A Practical Treatment, from Spectral Theory to Applications

The theory of integral equations has been an active research field for many years and is based on analysis, function theory, and functional analysis. On the other hand, integral equations are of practical interest because of the «boundary integral equation method», which transforms partial differential equations on a domain into integral equations over its boundary. This book grew out of a series of lectures given by the author at the Ruhr-Universitat Bochum and the Christian-Albrecht-Universitat zu Kiel to students of mathematics. The contents of the first six chapters correspond to an intensive lecture course of four hours per week for a semester. Readers of the book require background from analysis and the foundations of numeri cal mathematics. Knowledge of functional analysis is helpful, but to begin with some basic facts about Banach and Hilbert spaces are sufficient. The theoretical part of this book is reduced to a minimum; in Chapters 2, 4, and 5 more importance is attached to the numerical treatment of the integral equations than to their theory. Important parts of functional analysis (e. g. , the Riesz-Schauder theory) are presented without proof. We expect the reader either to be already familiar with functional analysis or to become motivated by the practical examples given here to read a book about this topic. We recall that also from a historical point of view, functional analysis was initially stimulated by the investigation of integral equations.