

# Access Free Solution Of Introductory Functional Analysis With Applications Erwin Kreyszig Read Pdf Free

*Introductory Functional Analysis with Applications* Introductory Functional Analysis with Applications An Introduction to Functional Analysis Introduction to Functional Analysis **An Introductory Course in Functional Analysis** Introductory Functional Analysis *Functional Analysis* **Functional Analysis An Introduction to Nonlinear Functional Analysis and Elliptic Problems** **Linear Functional Analysis** *Introductory Functional Analysis with Applications* *Functional Analysis* *Functional Analysis* **Introduction to Measure Theory and Functional Analysis** Introduction to Functional Analysis **An Introduction to Functional Analysis** *From Vector Spaces to Function Spaces* *Introductory Functional Analysis* **Functional Analysis** **Functional Analysis for Physics and Engineering** Functional Analysis **An Introduction to Functional Programming Through Lambda Calculus** **An Introduction to Identification Problems Via Functional Analysis** Theoretical Foundations of Functional Data Analysis, with an Introduction to Linear Operators **Functional Analysis, Sobolev Spaces and Partial Differential Equations** **Functional Analysis** *Functional Analysis for Probability and Stochastic Processes* **Introduction to Functional Data Analysis** *Functional Analysis* **Introduction to the Functional Renormalization Group Applied Nonlinear Functional Analysis** **A Course in Functional Analysis** Introduction to Functional Analysis *Introduction to Functional Analysis with Applications* **Topics in Functional Analysis and Applications** **Halliday's Introduction to Functional Grammar** *An Introduction to Partial Differential Equations* Functional Analysis **Functional Analysis** **Integral Equation & Boundary Value Problem**

this self contained textbook provides the basic abstract tools used in nonlinear analysis and their applications to semilinear elliptic boundary value problems and displays how various approaches can easily be applied to a range of model cases complete with a preliminary chapter an appendix that includes further results on weak derivatives and chapter by chapter exercises this book is a practical text for an introductory course or seminar on nonlinear functional analysis based on a graduate course by the celebrated analyst nigel kalton this well balanced introduction to functional analysis makes clear not only how but why the field developed all major topics belonging to a first course in functional analysis are covered however unlike traditional introductions to the subject banach spaces are emphasized over hilbert spaces and many details are presented in a novel manner such as the proof of the hahn banach theorem based on an inf convolution technique the proof of schauder s theorem and the proof of the milman pettis theorem with the inclusion of many illustrative examples and exercises an introductory course in functional analysis equips the reader to apply the theory and to master its subtleties it is therefore well suited as a textbook for a one or two semester introductory course in functional analysis or as a companion for independent study accessible text covering core functional analysis topics in hilbert and banach spaces with detailed proofs and 200 fully worked exercises partial differential equations are fundamental to the modeling of natural phenomena the desire to understand the solutions of these equations has always had a prominent place in the efforts of mathematicians and has inspired such diverse fields as complex function theory functional analysis and algebraic topology this book meant for a beginning graduate audience provides a

thorough introduction to partial differential equations this book covers such topics as  $L^p$  spaces distributions baire category probability theory and brownian motion several complex variables and oscillatory integrals in fourier analysis the authors focus on key results in each area highlighting their importance and the organic unity of the subject provided by publisher market desc undergraduate and graduate students in mathematics and physics engineering instructors this textbook provides an introduction to the methods and language of functional analysis including hilbert spaces fredholm theory for compact operators and spectral theory of self adjoint operators it also presents the basic theorems and methods of abstract functional analysis and a few applications of these methods to banach algebras and the theory of unbounded self adjoint operators the text corresponds to material for two semester courses part i and part ii respectively and is essentially self contained prerequisites for the first part are minimal amounts of linear algebra and calculus for the second part some knowledge of topology and measure theory is recommended each of the 11 chapters is followed by numerous exercises with solutions given at the end of the book the amount of mathematics presented in the book can well be absorbed in a year s study and will provide a sound basis for future reading it is suitable for graduate students and researchers interested in operator theory and functional analysis this textbook is an introduction to functional analysis suited to final year undergraduates or beginning graduates its various applications of hilbert spaces including least squares approximation inverse problems and tikhonov regularization should appeal not only to mathematicians interested in applications but also to researchers in related fields functional analysis adopts a self contained approach to banach spaces and operator theory that covers the main topics based upon the classical sequence and function spaces and their operators it assumes only a minimum of knowledge in elementary linear algebra and real analysis the latter is redone in the light of metric spaces it contains more than a thousand worked examples and exercises which make up the main body of the book the aim of this book is to provide a concise but complete introduction to the main

mathematical tools of nonlinear functional analysis which are also used in the study of concrete problems in economics engineering and physics this volume gathers the mathematical background needed in order to conduct research or to deal with theoretical problems and applications using the tools of nonlinear functional analysis providing an introduction to functional analysis this text treats in detail its application to boundary value problems and finite elements and is distinguished by the fact that abstract concepts are motivated and illustrated wherever possible it is intended for use by senior undergraduates and graduates in mathematics the physical sciences and engineering who may not have been exposed to the conventional prerequisites for a course in functional analysis such as real analysis mature researchers wishing to learn the basic ideas of functional analysis will equally find this useful offers a good grounding in those aspects of functional analysis which are most relevant to a proper understanding and appreciation of the mathematical aspects of boundary value problems and the finite element method this book is an introductory text in functional analysis unlike many modern treatments it begins with the particular and works its way to the more general from the reviews this book is an excellent text for a first graduate course in functional analysis many interesting and important applications are included it includes an abundance of exercises and is written in the engaging and lucid style which we have come to expect from the author mathematical reviews the book is written for students of mathematics and physics who have a basic knowledge of analysis and linear algebra it can be used as a textbook for courses and or seminars in functional analysis starting from metric spaces it proceeds quickly to the central results of the field including the theorem of hahnbanach the spaces  $p$   $L^p$   $X$   $C(X)$  and sobolov spaces are introduced a chapter on spectral theory contains the riesz theory of compact operators basic facts on banach and  $C$  algebras and the spectral representation for bounded normal and unbounded self adjoint operators in hilbert spaces an introduction to locally convex spaces and their duality theory provides the basis for a comprehensive treatment of  $F$   $l$   $ch$   $t$  spaces and their duals in particular recent results on sequences spaces linear topological

invariants and short exact sequences of free vector spaces and the splitting of such sequences are presented these results are not contained in any other book in this field fully updated and revised this fourth edition of halliday's introduction to functional grammar explains the principles of systemic functional grammar enabling the reader to understand and apply them in any context halliday's innovative approach of engaging with grammar through discourse has become a worldwide phenomenon in linguistics updates to the new edition include recent uses of systemic functional linguistics to provide further guidance for students scholars and researchers more on the ecology of grammar illustrating how each major system serves to realise a semantic system a systematic indexing and classification of examples more from corpora thus allowing for easy access to data halliday's introduction to functional grammar fourth edition is the standard reference text for systemic functional linguistics and an ideal introduction for students and scholars interested in the relation between grammar meaning and discourse this book gives an introduction to linear functional analysis which is a synthesis of algebra topology and analysis in addition to the basic theory it explains operator theory distributions sobolev spaces and many other things the text is self contained and includes all proofs as well as many exercises most of them with solutions moreover there are a number of appendices for example on lebesgue integration theory a complete introduction to the subject linear functional analysis will be particularly useful to readers who want to quickly get to the key statements and who are interested in applications to differential equations this textbook is a completely revised updated and expanded english edition of the important analyse fonctionnelle 1983 in addition it contains a wealth of problems and exercises with solutions to guide the reader uniquely this book presents in a coherent concise and unified way the main results from functional analysis together with the main results from the theory of partial differential equations pdes although there are many books on functional analysis and many on pdes this is the first to cover both of these closely connected topics since the french book was first published it has been translated into spanish italian japanese korean romanian

greek and chinese the english edition makes a welcome addition to this list this text presents selected areas of functional analysis that can facilitate an understanding of ideas in probability and stochastic processes topics covered include basic hilbert and banach spaces weak topologies and banach algebras and the theory of semigroups of bounded linear operators the renormalization group  $rg$  has nowadays achieved the status of a meta theory which is a theory about theories the theory of the  $rg$  consists of a set of concepts and methods which can be used to understand phenomena in many different fields of physics ranging from quantum field theory over classical statistical mechanics to nonequilibrium phenomena  $rg$  methods are particularly useful to understand phenomena where situations involving many different length or time scales lead to the emergence of new collective behavior in complex many body systems in view of the diversity of fields where  $rg$  methods have been successfully applied it is not surprising that a variety of apparently different implementations of the  $rg$  idea have been proposed unfortunately this makes it somewhat difficult for beginners to learn this technique for example the field theoretical formulation of the  $rg$  idea looks at the first sight rather different from the  $rg$  approach pioneered by wilson the latter being based on the concept of the effective action which is iteratively calculated by successive elimination of the high energy degrees of freedom moreover the wilsonian  $rg$  idea has been implemented in many different ways depending on the particular problem at hand and there seems to be no canonical way of setting up the  $rg$  procedure for a given problem well respected text for computer science students provides an accessible introduction to functional programming cogent examples illuminate the central ideas and numerous exercises offer reinforcement includes solutions 1989 edition text covers introduction to inner product spaces normed metric spaces and topological spaces complete orthonormal sets the hahn banach theorem and its consequences and many other related subjects 1966 edition this textbook provides an introduction to the methods and language of functional analysis including hilbert spaces fredholm theory for compact operators and spectral theory of self adjoint operators it also presents the basic

theorems and methods of abstract functional analysis and a few applications of these methods to banach algebras and the theory of unbounded self adjoint operators the text corresponds to material for two semester courses part i and part ii respectively and is essentially self contained prerequisites for the first part are minimal amounts of linear algebra and calculus for the second part some knowledge of topology and measure theory is recommended each of the 11 chapters is followed by numerous exercises with solutions given at the end of the book the amount of mathematics presented in the book can well be absorbed in a year s study and will provide a sound basis for future reading it is suitable for graduate students and researchers interested in operator theory and functional analysis this monograph is based on two courses in computational mathematics and operative research which were given by the author in recent years to doctorate and phd students the text focuses on an aspect of the theory of inverse problems which is usually referred to as identification of parameters numbers vectors matrices functions appearing in differential or integrodifferential equations the parameters of such equations are either quite unknown or partially unknown however knowledge about these is usually essential as they describe the intrinsic properties of the material or substance under consideration introduction to functional data analysis provides a concise textbook introduction to the field it explains how to analyze functional data both at exploratory and inferential levels it also provides a systematic and accessible exposition of the methodology and the required mathematical framework the book can be used as textbook for a semester long course on fda for advanced undergraduate or ms statistics majors as well as for ms and phd students in other disciplines including applied mathematics environmental science public health medical research geophysical sciences and economics it can also be used for self study and as a reference for researchers in those fields who wish to acquire solid understanding of fda methodology and practical guidance for its implementation each chapter contains plentiful examples of relevant r code and theoretical and data analytic problems the material of the book can be roughly divided into four parts of approximately equal length 1

basic concepts and techniques of fda 2 functional regression models 3 sparse and dependent functional data and 4 introduction to the hilbert space framework of fda the book assumes advanced undergraduate background in calculus linear algebra distributional probability theory foundations of statistical inference and some familiarity with r programming other required statistics background is provided in scalar settings before the related functional concepts are developed most chapters end with references to more advanced research for those who wish to gain a more in depth understanding of a specific topic this book is an introductory text written with minimal prerequisites the plan is to impose a distance structure on a linear space exploit it fully and then introduce additional features only when one cannot get any further without them the book naturally falls into two parts and each of them is developed independently of the other the first part deals with normed spaces their completeness and continuous linear maps on them including the theory of compact operators the much shorter second part treats hilbert spaces and leads upto the spectral theorem for compact self adjoint operators four appendices point out areas of further development emphasis is on giving a number of examples to illustrate abstract concepts and on citing various applications of results proved in the text in addition to proving existence and uniqueness of a solution its approximate construction is indicated problems of varying degrees of difficulty are given at the end of each section their statements contain the answers as well strictly according to the latest syllabus of u g c for degree level students and for various engineering and professional examinations such as gate c s i r net jrfand slet etc for m a m sc mathematics also based on an introductory graduate level course given by swartz at new mexico state u this textbook written for students with a moderate knowledge of point set topology and integration theory explains the principles and theories of functional analysis and their applications showing the interpla theoretical foundations of functional data analysis with an introduction to linear operators provides a uniquely broad compendium of the key mathematical concepts and results that are relevant for the theoretical development of functional data analysis

functional analysis and operator theory includes reproducing kernel hilbert spaces singular value decomposition of compact operators on hilbert spaces and perturbation theory for both self adjoint and non self adjoint operators the probabilistic foundation for functional analysis is described from the perspective of random elements in hilbert spaces as well as from the viewpoint of continuous time stochastic processes nonparametric estimation approaches including kernel and regularized smoothing are also introduced these tools are then used to investigate the properties of estimators for the mean element covariance operators principal components regression function and canonical correlations a general treatment of canonical correlations in hilbert spaces naturally leads to functional analysis formulations of factor analysis regression manova and discriminant analysis this book will provide a valuable reference for statisticians and other researchers interested in developing or understanding the mathematical aspects of functional analysis it is also suitable for a graduate level special topics course this book introduces functional analysis at an elementary level without assuming any background in real analysis for example on metric spaces or lebesgue integration it focuses on concepts and methods relevant in applied contexts such as variational methods on hilbert spaces neumann series eigenvalue expansions for compact self adjoint operators weak differentiation and sobolev spaces on intervals and model applications to differential and integral equations beyond that the final chapters on the uniform boundedness theorem the open mapping theorem and the hahn banach theorem provide a stepping stone to more advanced texts the exposition is clear and rigorous featuring full and detailed proofs many examples illustrate the new notions and results each chapter concludes with a large collection of exercises some of which are referred to in the margin of the text tailor made in order to guide the student digesting the new material optional sections and chapters supplement the mandatory parts and allow for modular teaching spanning from basic to honors track level functional analysis has become one of the essential foundations of modern applied mathematics in the last decades from the theory and numerical solution

of differential equations from optimization and probability theory to medical imaging and mathematical image processing this textbook offers a compact introduction to the theory and is designed to be used during one semester fitting exactly 26 lectures of 90 minutes each it ranges from the topological fundamentals recalled from basic lectures on real analysis to spectral theory in hilbert spaces special attention is given to the central results on dual spaces and weak convergence a guide to analytic methods in applied mathematics from the perspective of functional analysis suitable for scientists engineers and students this book introduces readers to theories that play a crucial role in modern mathematics such as integration and functional analysis employing a unifying approach that views these two subjects as being deeply intertwined this feature is particularly evident in the broad range of problems examined the solutions of which are often supported by generous hints if the material is split into two courses it can be supplemented by additional topics from the third part of the book such as functions of bounded variation absolutely continuous functions and signed measures this textbook addresses the needs of graduate students in mathematics who will find the basic material they will need in their future careers as well as those of researchers who will appreciate the self contained exposition which requires no other preliminaries than basic calculus and linear algebra kreyszig the wiley classics library consists of selected books originally published by john wiley sons that have become recognized classics in their respective fields with these new unabridged and inexpensive editions wiley hopes to extend the life of these important works by making them available to future generations of mathematicians and scientists currently available in the series emil artin geometric algebra r w carter simple groups of lie type richard courant differential and integral calculus volume i richard courant differential and integral calculus volume ii richard courant d hilbert methods of mathematical physics volume i richard courant d hilbert methods of mathematical physics volume ii harold m s coxeter introduction to modern geometry second edition charles w curtis irving reiner representation theory of finite groups and associative algebras nelson

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siegel topics in complex function theory volume iii abelian functions  
modular functions of several variables j j stoker differential geometry  
providing an introduction to functional analysis this text treats in detail  
its application to boundary value problems and finite elements and is  
distinguished by the fact that abstract concepts are motivated and  
illustrated wherever possible it is intended for use by senior  
undergraduates and graduates in mathematics the physical sciences and  
engineering who may not have been exposed to the conventional  
prerequisites for a course in functional analysis such as real analysis  
mature researchers wishing to learn the basic ideas of functional analysis  
will equally find this useful offers a good grounding in those aspects of  
functional analysis which are most relevant to a proper understanding  
and appreciation of the mathematical aspects of boundary value  
problems and the finite element method this concise text provides a  
gentle introduction to functional analysis chapters cover essential topics  
such as special spaces normed spaces linear functionals and hilbert  
spaces numerous examples and counterexamples aid in the  
understanding of key concepts while exercises at the end of each chapter  
provide ample opportunities for practice with the material proofs of  
theorems such as the uniform boundedness theorem the open mapping  
theorem and the closed graph theorem are worked through step by step  
providing an accessible avenue to understanding these important results  
the prerequisites for this book are linear algebra and elementary real

analysis with two introductory chapters providing an overview of  
material necessary for the subsequent text functional analysis offers an  
elementary approach ideal for the upper undergraduate or beginning  
graduate student primarily intended for a one semester introductory  
course this text is also a perfect resource for independent study or as the  
basis for a reading course key features basic knowledge in functional  
analysis is a pre requisite illustrations via partial differential equations of  
physics provided exercises given in each chapter to augment concepts  
and theorems about the book the book written to give a fairly  
comprehensive treatment of the techniques from functional analysis used  
in the modern theory of partial differential equations is now in its third  
edition the original structure of the book has been retained but each  
chapter has been revamped proofs of several theorems have been either  
simplified or elaborated in order to achieve greater clarity it is hoped  
that this version is even more user friendly than before in the chapter on  
distributions some additional results with proof have been presented the  
section on convolution of functions has been rewritten in the chapter on  
sobolev spaces the section containing stampacchia's theorem on  
composition of functions has been reorganized some additional results on  
eigenvalue problems are presented the material in the text is  
supplemented by four appendices and updated bibliography at the end  
this book provides an introduction to functional analysis for non experts  
in mathematics as such it is distinct from most other books on the  
subject that are intended for mathematicians concepts are explained  
concisely with visual materials making it accessible for those unfamiliar  
with graduate level mathematics topics include topology vector spaces  
tensor spaces lebesgue integrals and operators to name a few two  
central issues the theory of hilbert space and the operator theory and  
how they relate to quantum physics are covered extensively each chapter  
explains concisely the purpose of the specific topic and the benefit of  
understanding it researchers and graduate students in physics  
mechanical engineering and information science will benefit from this  
view of functional analysis a powerful introduction to one of the most  
active areas of theoretical and applied mathematics this distinctive

introduction to one of the most far reaching and beautiful areas of mathematics focuses on Banach spaces as the milieu in which most of the fundamental concepts are presented while occasionally using the more general topological vector space and locally convex space setting it emphasizes the development of the reader's mathematical maturity and the ability to both understand and do mathematics in so doing functional analysis provides a strong springboard for further exploration on the wider range of topics the book presents including weak topologies and applications operators on Banach spaces bases in Banach spaces sequences series and geometry in Banach spaces stressing the general techniques underlying the proofs functional analysis also features many exercises for immediate clarification of points under discussion this thoughtful well organized synthesis of the work of those mathematicians who created the discipline of functional analysis as we know it today also provides a rich source of research topics and reference material as science and technology are increasingly refined and interrelated the demand for mathematical concepts beyond vector algebra and differential and integral calculus has greatly increased there are four fundamental theorems dealing with properties of functionals and operators called Hahn-Banach theorem Banach-Steinhaus theorem open mapping theorem and closed graph theorem notions of differentiability and integrability of operators are also studied in functional analysis applications of functional analysis to operator equations boundary value problems optimization variational inequalities finite element methods optimal control and wavelets are all discussed at length reflecting current trends in the study of functional analysis this book introduces the above concepts in a way accessible to readers having minimum possible prerequisite of undergraduate mathematics

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