Ordinary Differential Equations and Infinite Series by Sam Melkonian

Linear Differential Equations of Infinite Order
The Theory of Ordinary Differential Equations
Nonlinear Ordinary Differential Equations in Transport Processes
Linear Differential Equations of Infinite Order and with Constant Coefficients
Systems of Linear Differential Equations of Infinite Order
On the Theory of Ordinary Differential Equations of Infinite Order
Stochastic Differential Equations in Infinite Dimensions
Ordinary Differential Equations
Ordinary Differential Equations and Stability Theory
Ordinary Differential Equations with Applications
Infinite Interval Problems for Differential, Difference and Integral Equations
Second Course in Ordinary Differential Equations for Scientists and Engineers
On Successive Approximations of an Infinite System of Ordinary Differential Equations
Ordinary Differential Equations
Linear Differential Equations of Infinite Order with Constant Coefficients and Asymptotic Periods of Entire Functions
Ordinary Differential Equations
Custom Publication
Some Efficient Methods for Obtaining Infinite Series Solutions of N-th-order Linear Ordinary Differential Equations
Linear Differential Equations of Infinite Order, with Polynomial Coefficients of Degree One
Differential Equations with a Continuous Infinitude of Variables
Functional Differential Equations with Infinite Delay
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On the Validity of Truncation for Infinite Systems of Ordinary Differential Equations Associated with Nonlinear Partial Differential Equations
Ordinary Differential Equations
With Applications
Ordinary Differential Equations
Infinite Series & Ordinary Differential Equations
Infinite Systems of Ordinary Differential Equations Etc
Infinite Dimensional Dynamics Described by Ordinary Differential Equations
Solutions of...
The systematic study of existence, uniqueness, and properties of solutions to stochastic differential equations in infinite dimensions arising from practical problems characterizes this volume that is intended for graduate students and for pure and applied mathematicians, physicists, engineers, professionals working with mathematical models of finance. Major methods include compactness, coercivity, monotonicity, in a variety of set-ups. The authors emphasize the fundamental work of Gikhman and Skorokhod on the existence and uniqueness of solutions to stochastic differential equations and present its extension to infinite dimension. They also generalize the work of Khasminskii on stability and stationary distributions of solutions. New results, applications, and examples of stochastic partial differential equations are included. This clear and detailed presentation gives the basics of the infinite dimensional version of the classic books of Gikhman and Skorokhod and of Khasminskii
in one concise volume that covers the main topics in infinite dimensional stochastic PDE’s. By appropriate selection of material, the volume can be adapted for a 1- or 2-semester course, and can prepare the reader for research in this rapidly expanding area.

Beginning with a general discussion of the linear equation, topics developed include stability theory for autonomous and nonautonomous systems. Two appendices are also provided, and there are problems at the end of each chapter — 55 in all. Unabridged republication of the original (1968) edition. Appendices. Bibliography. Index. 55 problems.

Based on a one-year course taught by the author to graduates at the University of Missouri, this book provides a student-friendly account of some of the standard topics encountered in an introductory course of ordinary differential equations. In a second semester, these ideas can be expanded by introducing more advanced concepts and applications. A central theme in the book is the use of Implicit Function Theorem, while the latter sections of the book introduce the basic ideas of perturbation theory as applications of this Theorem. The book also contains material differing from standard treatments, for example, the Fiber Contraction Principle is used to prove the smoothness of functions that are obtained as fixed points of contractions. The ideas introduced in this section can be extended to infinite dimensions.
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Infinite interval problems abound in nature and yet until now there has been no book dealing with such problems. The main reason for this seems to be that until the 1970's for the infinite interval problem all the theoretical results available required rather technical hypotheses and were applicable only to narrowly defined classes of problems. Thus scientists mainly offered and used special devices to construct the numerical solution assuming tacitly the existence of a solution. In recent years a mixture of classical analysis and modern fixed point theory has been employed to study the existence of solutions to infinite interval problems. This has resulted in widely applicable results. This monograph is a cumulation mainly of the authors' research over a period of more than ten years and offers easily verifiable existence criteria for differential, difference and integral equations over the infinite interval. An important feature of this monograph is that we illustrate almost all the results with examples. The plan of this
monograph is as follows. In Chapter 1 we present the existence theory for second order boundary value problems on infinite intervals. We begin with several examples which model real world phenomena. A brief history of the infinite interval problem is also included. We then present general existence results for several different types of boundary value problems. Here we note that for the infinite interval problem only two major approaches are available in the literature.

Nonlinear Ordinary Differential Equations in Transport Processes

This book fills the need for a junior-senior level book on the more advanced topics of differential equations. It attempts to blend mathematical theory with nontrivial applications from various disciplines. It does not contain lengthy proofs of mathematical theorems. In each case, examples are shown to support theorems and their practical use, and in some cases an "intuitive proof" is included. A wide range of topics is included to afford flexibility if used for a course.

Building on introductory calculus courses, this text provides a sound foundation in the underlying principles of ordinary differential equations. Important concepts, including uniqueness and existence theorems, are worked through in detail and the student is encouraged to develop much of the routine material themselves, thus helping to ensure a solid understanding of the fundamentals required. The wide use of exercises, problems and self-assessment questions helps to promote a deeper understanding of the material and it is developed in such a way that it lays the groundwork for further study of partial differential equations.
This unified, revised second edition of a two-volume set is a self-contained account of quadratic cost optimal control for a large class of infinite-dimensional systems. The original editions received outstanding reviews, yet this new edition is more concise and self-contained. New material has been added to reflect the growth in the field over the past decade. There is a unique chapter on semigroup theory of linear operators that brings together advanced concepts and techniques which are usually treated independently. The material on delay systems and structural operators has not yet appeared anywhere in book form.

In the theory of functional differential equations with infinite delay, there are several ways to choose the space of initial functions (phase space); and diverse (duplicated) theories arise, according to the choice of phase space. To unify the theories, an axiomatic approach has been taken since the 1960's. This book is intended as a guide for the axiomatic approach to the theory of equations with infinite delay and a culmination of the results obtained in this way. It can also be used as a textbook for a graduate course. The prerequisite knowledge is foundations of analysis including linear algebra and functional analysis. It is hoped that the book will prepare students for further study of this area, and that will serve as a ready reference to the researchers in applied analysis and engineering sciences.

The use of the theta-operator method and generalized hypergeometric functions in obtaining solutions to nth-order linear ordinary differential equations is explained. For completeness, the analysis of the differential equation to determine whether the point of expansion is an ordinary point or a regular singular point is included. The superiority of the two methods shown over the standard method is
demonstrated by using all three of the methods to work out several examples. Also included is a compendium of formulae and properties of the theta operator and generalized hypergeometric functions which is complete enough to make the report self-contained.

Among the topics covered in this classic treatment are linear differential equations; solution in an infinite form; solution by definite integrals; algebraic theory; Sturmian theory and its later developments; further developments in the theory of boundary problems; existence theorems, equations of first order; nonlinear equations of higher order; more. "Highly recommended" — Electronics Industries.

This text is a rigorous treatment of the basic qualitative theory of ordinary differential equations, at the beginning graduate level. Designed as a flexible one-semester course but offering enough material for two semesters, A Short Course covers core topics such as initial value problems, linear differential equations, Lyapunov stability, dynamical systems and the Poincaré—Bendixson theorem, and bifurcation theory, and second-order topics including oscillation theory, boundary value problems, and Sturm—Liouville problems. The presentation is clear and easy-to-understand, with figures and copious examples illustrating the meaning of and motivation behind definitions, hypotheses, and general theorems. A thoughtfully conceived selection of exercises together with answers and hints reinforce the reader's understanding of the material. Prerequisites are limited to advanced calculus and the elementary theory of differential equations and linear algebra, making the text suitable for senior undergraduates as
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