L S Pontryagin Selected Works

Selected Research Papers. R.V. Gamkrelidze 1990

Algebraic and Differential Topology

N. N. Bogoliubov Jr. 1991

A. D. Alexandrov Selected Works

L. V. Kantorovich 1996

R. V. Gamkrelidze 1991

L. S. Pontryagin Selected Works

Y. G. Reshetnyak 1993

Lev Semenovich Pontryagin 1986


- Applied Functional Analysis. Approximation Methods and Computers

S. S. Kutateladze 2010-12-12 This book contains the most remarkable papers of L.V. Kantorovich in applied and numerical mathematics. It explores the principal directions of Kantorovich's research in approximate methods. The book covers descriptive set theory and functional analysis in semi-ordered vector spaces.
Dynamical Theory  N. N. Bogolyubov 1990 A collection of Bogolyubov's papers on dynamical theory, which introduce the key concept of the hierarchy of relaxation times in statistical physics. A method of solving a system of coupled equations for the probability density for groups of one or more particles is proposed. This has proved to be the most effective method in statistical mechanics for equilibrium and non-equilibrium to date. In his papers, Bogolyubov clarifies how stochastic behaviour, which is specific for a macroscopic description, arises in a purely mechanistic approach, in which microscopic equations of dynamical theory are used.

Modern Geometric Structures and Fields  Sergey G. Gusev 2006-01 The book presents the basics of Riemannian geometry in its modern form as geometry of differentiable manifolds and the most important structures on them. The authors show how all constructions in Riemannian geometry is a manifold that allows one to compute scalar products of tangent vectors. With this approach, the authors show how Riemannian geometry has a great influence to several fundamental areas of modern mathematics and its applications. In particular, Geometry is a bridge between pure mathematics and natural sciences, first of all physics. Fundamental laws of nature are formulated as relations between geometric fields describing various physical quantities. The study of global properties of geometric objects leads to the far-reaching development of topology, including topology and geometry of fiber bundles. Geometry of Hamiltonian systems, which describe many physical phenomena, led to the development of symplectic and Poisson geometry. Field theory and the multidimensional calculus of variations, presented in the book, unify mathematics with theoretical physics. Geometry of complex and algebraic manifolds unifies Riemannian geometry with modern complex analysis, as well as with algebra and number theory. Prerequisites for using the book include several basic undergraduate courses, such as advanced calculus, linear algebra, ordinary differential equations, and elements of topology.

Selected Works  A. N. Kolmogorov 2017-02-29 The work presents the basics of Riemannian geometry in its modern form as geometry of differentiable manifolds and the most important structures on them. The authors show how all constructions in Riemannian geometry is a manifold that allows one to compute scalar products of tangent vectors. With this approach, the authors show how Riemannian geometry has a great influence to several fundamental areas of modern mathematics and its applications. In particular, Geometry is a bridge between pure mathematics and natural sciences, first of all physics. Fundamental laws of nature are formulated as relations between geometric fields describing various physical quantities. The study of global properties of geometric objects leads to the far-reaching development of topology, including topology and geometry of fiber bundles. Geometry of Hamiltonian systems, which describe many physical phenomena, led to the development of symplectic and Poisson geometry. Field theory and the multidimensional calculus of variations, presented in the book, unify mathematics with theoretical physics. Geometry of complex and algebraic manifolds unifies Riemannian geometry with modern complex analysis, as well as with algebra and number theory. Prerequisites for using the book include several basic undergraduate courses, such as advanced calculus, linear algebra, ordinary differential equations, and elements of topology.

From Aristotlean to Reagonomics  R. C. S. Trafair 1994 Trafair provides brief historical definitions for eponyms and some tynopisms from a range of broad social sciences, with each entry including biographical and bibliographical information.

Optimization: Techniques And Applications (Icosta '95)-Luo G 1995-09-01

Dynamical Systems and Geometric Mechanics - Jared Maruškin 2018-08-21 Introduction to Dynamical Systems and Geometric Mechanics provides a comprehensive tour of two fields that are intimately entwined: dynamical systems is the study of the behavior of physical systems that may be described by a set of nonlinear first-order ordinary differential equations in Euclidean space, whereas geometric mechanics explore similar systems that instead evolve on differentiable manifolds. The first part discusses the linearization and stability of trajectories and fixed points, invariant manifold theory, periodic orbits, Poincaré maps, Floquet theory, the Poincaré-Bendixon theorem, bifurcations, and chaos. The second part of the book begins with a self-contained chapter on differential geometry that introduces notions of manifolds, mappings, vector fields, the Jacobo-Lie bracket, and differential forms.

Differential Equations - K. D. Eberly 2017-11-22 Presents recent developments in the areas of differential equations, dynamical systems, and control of finite and infinite dimensional systems. Focuses on current trends in differential equations and dynamical system research from Darmettedependence of solutions to robust control laws for infinite dimensional systems.

Intelligent Computing - Kohes Arai 2020-07-03 This book focuses on the core areas of computing and their applications in the real world. Presenting papers from the Computing Conference 2020 covers a diverse range of research areas, describing various detailed techniques that have been developed and implemented. The Computing Conference 2020, which provided a venue for academic and industry practitioners to share new ideas and development experiences, attracted a total of 514 submissions from pioneering academic researchers, scientists, industrial engineers and students from around the world. Following a double-blind, peer-review process, 160 papers (including 15 poster papers) were selected to be included in these proceedings. Featuring state-of-the-art intelligent methods and techniques for solving real-world problems, the book is a valuable resource and will inspire further research and technological improvements in this important area.

Compact Projective Planes - Helmut Salzmann 1995-01-01 The aim of the series is to present new and important developments in pure and applied mathematics. Well established in the community over two decades, it offers a large library of mathematics including several important classics. The volumes supply thorough and detailed expositions of the methods and ideas essential to the topics in question. In addition, they convey the relationships to other parts of mathematics. The series is addressed to advanced readers wishing to thoroughly study the topic. Editorial Board Lev Birbrair, University of Federal do Ceará, Fortaleza, Brazil Victor P. Maslov, Russian Academy of Sciences, Moscow, Russia Walter D. Neumann, Columbia University, New York, USA Markus J. Pflaum, University of Colorado, Boulder, USA Dierk Schleicher, Jacobs University, Bremen, Germany.

A Primer on the Calculus of Variations and Optimal Control Theory - Mike Menterton-Gibbons 2009 The calculus of variations is used to find functions that optimize quantities expressed in terms of integrals. Optimal control theory seeks to find functions that minimize cost integrals for systems described by differential equations. This book is an introduction to both the classical theory of the calculus of variations and the more modern developments in optimal control theory from the perspective of an applied mathematician. It focuses on understanding concepts and how to apply them. The range of potential applications is widespread, the calculus of variations and optimal control theory have been widely used in numerous ways in biology, criminology, economics, engineering, finance, management science, and physics. Applications described in this book include cancer chemotherapy, navigational control, and renewable resource harvesting. The prerequisites for the book are modest: the standard calculus sequence, a first course on ordinary differential equations, and some facility with the use of mathematical software. It is suitable for an undergraduate or beginning graduate course, or for self-study. It provides excellent preparation for more advanced books and courses on the calculus of variations and optimal control theory.

Planning Algorithms - Steven M. LaValle 2006-05-29 Planning algorithms are impacting technical disciplines and industries around the world, including robotics, computer-aided design, manufacturing, computer graphics, aerospace applications, drug design, and protein folding. This coherent and comprehensive book unifies material from several sources, including robotics, control theory, artificial intelligence, and algorithms. The treatment is centered on robot motion planning, but integrates material on planning in discrete spaces. A major part of the book is devoted to planning under uncertainty, including decision theory, Markov decision processes, and information spaces, which are the ‘configuration spaces’ of all sensor-based planning problems. The last part of the book delves into planning under differential constraints that arise when automating the motions of virtually any mechanical system. This text and reference is intended for students, engineers, and researchers in robotics, artificial intelligence, and control theory as well as computer graphics, algorithms, and computational biology.

Lectures on Gaussian Integral Operators and Classical Groups - Yu. A. Neretin 2011 This book is an elementary self-contained introduction to some constructions of representation theory and related topics of differential geometry and analysis. Topics covered include the theory of various Fourier-like integral operators such as Segal-Bargmann transforms, Gaussian integral operators in $L^2$ and in the Fock space, integral operators with theta-kernels, the geometry of real and $p$-adic classical groups and symmetric spaces. The heart of the book is the Weil representation of the symplectic group (real and complex realizations, relations with theta-functions and modular forms, $p$-adic and adelic constructions) and representations in Hilbert spaces of holomorphic functions of several complex variables. This book is addressed to graduate students and researchers in representation theory, differential geometry, and operator theory. Prerequisites are standard university courses in linear algebra, functional analysis, and complex analysis.

Microbiobotics - Minjun Kim 2012 Microbiobotics is a new engineering discipline that inherently involves a multidisciplinary approach (mechanical engineering, cellular biology, mathematical modeling, control systems, synthetic biology, etc.). Building robotics system in the micro scale is an engineering task that has resulted in many important applications, ranging from nanomanufacturing techniques to cellular manipulation. However, it is also a very challenging engineering task. One of the reasons is because many engineering ideas and principles that are used in larger scales do not scale well to the micro-scale. For example, locomotion principles in a fluid do not function in the same way, and the use of rotational motors is impractical because of the difficulty of building of the required components. Microbiotics is an area that is acknowledged to have massive potential in applications from medicine to manufacturing. This book introduces an interdisciplinary approach to the toolkit that micro-organisms offer to micro-engineering. The design of robots, sensors and actuators faces a range of technology challenges at the micro-scale. This book shows how biological technologies and materials can be used to meet these challenges. World-class multi-disciplinary editors and contributors leverage insights from engineering, mathematical modeling and the life sciences - creating a novel toolkit for microbiotics.

Elie Cartan (1869-1951)-Maks Aizikovich Akivis 1993 This book describes the life and achievements of the great french mathematician, Elie Cartan. Here readers will find detailed descriptions of Cartan's discoveries in Lie groups and algebras, associative algebras, differential geometry, as well as later developments stemming from his ideas. The volume includes a biographical sketch of Cartan's life. A monumental tribute to a towering figure in the history of mathematics, this book will appeal to mathematicians and historians alike.
Among the finest achievements in modern mathematics are two of L.S. Pontryagin’s most notable contributions: Pontryagin duality and his general theory of characters of a locally compact commutative group. This book, the first in a four-volume set, contains the most important papers of this eminent mathematician, those which have influenced many generations of mathematicians worldwide. They chronicle the development of his work in many areas, from his early efforts in homology groups, duality theorems, and dimension theory to his later achievements in homotopic topology and optimal control theory.

Offering the insights of L.S. Pontryagin, one of the foremost thinkers in modern mathematics, the second volume in this four-volume set examines the nature and processes that make up topological groups. Already hailed as the leading work in this subject for its abundance of examples and its thorough explanations, the text is arranged so that readers can follow the material either sequentially or schematically. Stand-alone chapters cover such topics as topological division rings, linear representations of compact topological groups, and the concept of a lie group.

Ordinary Differential Equations presents the study of the system of ordinary differential equations and its applications to engineering. The book is designed to serve as a first course in differential equations. Importance is given to the linear equation with constant coefficients; stability theory; use of matrices and linear algebra; and the introduction to the Lyapunov theory. Engineering problems such as the Watt regulator for a steam engine and the vacuum-tube circuit are also presented. Engineers, mathematicians, and engineering students will find the book invaluable.

The theory of partial differential equations is a wide and rapidly developing branch of contemporary mathematics. Problems related to partial differential equations of order higher than one are so diverse that a general theory can hardly be built up. There are several essentially different kinds of differential equations called elliptic, hyperbolic, and parabolic. Regarding the construction of solutions of Cauchy, mixed and boundary value problems, each kind of equation exhibits entirely different properties. Cauchy problems for hyperbolic equations and systems with variable coefficients have been studied in classical works of Petrovskii, Leret, Courant, Gording. Mixed problems for hyperbolic equations were considered by Vishik, Ladyzhenskaya, and that for general two dimensional equations were investigated by Bitsadze, Vishik, Gol'dberg, Ladyzhenskaya, Myshkis, and others. In last decade the theory of solvability on the whole of boundary value problems for nonlinear differential equations has received intensive development. Significant results for nonlinear elliptic and parabolic equations of second order were obtained in works of Gvazava, Ladyzhenskaya, Nakhushev, Oleinik, Skripnik, and others. Concerning the solvability in general of nonlinear hyperbolic equations, which are connected to the theory of local and nonlocal boundary value problems for hyperbolic equations, there are only partial results obtained by Bronstein, Pukhovshv, Nakhushev.

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