L S Pontryagin Selected Works

Selected Research Papers by L.S. Pontryagin (1919-1988) Among the most celebrated 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, which have influenced many generations of mathematicians. It chronicles the development of his work in many areas, from his early efforts in homology and duality theory, through his studies in optimal control. On 3 September 1983 Lev Pontryagin passed away leaving behind a lifetime of outstanding contributions. This collection provides a monumental overview of his work, giving all the essential references and modern developments that have followed. The second volume contains a set of Pontryagin’s papers on the theory of general functions and the theory of invariants. The third volume contains the early works, including some of his most fundamental contributions to the theory of optimal control and differential games. The fourth and final volume presents the maximum principle as a wide-ranging solution to nonclassical, variational problems. This one mathematical method can be applied in a variety of situations, leading to a wealth of classical results and new insights into the development of topology, including applications to the study of dynamical systems.

L.S. Pontryagin Selected Works: Algebraic and differential topology

Algebraic and Differential Topology - L.S. Pontryagin 1987-03-06 This book presents articles of L.S. Pontryagin on the descriptive theory of sets and function and on functional analysis in semi-ordered vector spaces, to demonstrate the unity of L.S. Pontryagin’s creative research. It also includes two papers on the “reconstruction of Hilbert space”.

Modern Geometric Structures and Fields: Yu. G. Reshetnyak 2002-02-21 Alexandr Danilovich Alexandrov has been called a giant of 20th-century mathematics. This volume contains some of the most important papers by this renowned geomter and hence, some of his most influential ideas. Alexandrov addressed a wide range of modern mathematical problems, and he did so with intelligence and elegance, solving some of the discipline’s most difficult and enduring challenges. He was the first to apply many of the tools and methods of the theory of real functions and functional analysis that are now current in geometry. The topics here include convex polyhedrons and closed surfaces, an elementary introduction to Riemannian geometry and a method for Dirichlet problems. This monograph, published in English for the first time, gives unsolved questions to a brilliant mind, and advanced students and researchers in applied mathematics and geometry will find it indispensable.


Dynamical Theory - N. N. Bogoliubov 1990 A collection of Bogoliubov’s papers on dynamical theory, which introduce the key concepts of the hierarchy of relaxation times or, in more particle is proposed. This has proved to be the most effective method to study the stability and evolution of a system, and has been widely applied in many fields. The book covers topics such as wave equations, differential equations, and the calculus of variations.


Differential Equations - M. I. Muscat 1996-09-10 Part of The Works of Issai Schur 2002-01-01 The aim of the series is to present recent developments in the areas of dynamical systems, differential equations, and control of finite and infinite dimensional systems. Focuses on current trends in differential equations and dynamical systems research from the perspective of random matrices, where the focus is on the behavior of solutions to stochastic differential equations.

A Primer on the Calculus of Variations and Optimal Control Theory - Mike Westmore-Gibbon 2008 The calculus of variations is used to find its function that optimizes or minimizes a given functional. Optimal control theory seeks to find the control that optimizes a given functional over time. This book covers the calculus of variations and optimal control theory. It introduces to both the classical theory of the calculus of variations and the modern developments of optimal control theory, with a focus on applied mathematics. It provides an understanding of the calculus of variations and optimal control theory.

Differential Equations 5.6 - Diversity in Mathematics 2011-12-22 Present research developments in the areas of dynamical systems, differential equations, and control of finite and infinite dimensional systems. Focuses on current trends in differential equations and dynamical systems research from the perspective of random matrices, where the focus is on the behavior of solutions to stochastic differential equations.
Lectures on Gaussian Integral Operators and Classical Groups / Ya. I. Novikov 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 vector Poincaré-like integral operators such as Segal-Bargmann transforms, Gaussian integral operators in 6D and in the 4D case, integral operators with theta-determinants, the geometry of real and hyperbolic classical groups and symmetric spaces. The heart of the book is the representation of the symmetric group (real and complex realizations, relations with beta-functions and modular forms, type-B and type-D 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. The prerequisites are standard university courses in linear algebra, functional analysis, and complex analysis.

Microcomputers in Medicine (Major Kim 2012) Microcomputers is a new emerging discipline that inherently involves a multidisciplinary approach (mechanical engineering, cellular biology, mathematical modeling, control systems, synthetic biology, etc). Building robotics in the microscale is an emerging topic but has resulted in many important applications, ranging from micro-inspecting 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 as a fluid do not function in the same way, and the use of rational motors is impractical because of the difficulty of building of the required components. Microcomputers in medicine is an area that is acknowledged to have massive potential in applications from medicine to manufacturing. This book introduces an interdisciplinary modeling to the tools that microorganisms offer to micro-engineering. The design of robots, sensors and actuators has a range of technological challenges at the micro scale. This book shows how biological techniques and materials can be used to meet these challenges. World-class multidisciplinary editions and contributions leverage insights from engineering, mathematical modeling and the life sciences - creating a novel field for microcomputer research.

Selected Research Papers / L.S. Pontryagin 1987-03-06 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 series, contains the most important of this eminent mathematician, whose influence has been many generations of mathematicians worldwide. They chronicle the development of his work in many areas, from his early efforts in homology, duality theorems, and dimension theory to his later achievements in harmonic topology and optimal control theory.

Vladimir I. Arnold - Collected Works / Vladimir I. Arnold 2013-12-11 Vladimir Arnold was one of the greatest mathematical scientists of our time. He is famous for both the breadth and the depth of his work. At the same time he is one of the most prolific and outstanding mathematical authors. This second volume of the Collected Works focuses on hydrodynamics, information theory, and algebraic geometry.

Electromagnetics and Robotics / Andrey Ronzhin 2021-08-28 This book features selected papers presented at the 30th International Conference on Electromagnetics and Robotics "Zavalishin's Readings" - ER(ZR) 2021, held in St. Petersburg, Russia, on April 14-17, 2021. This conference was established as a tribute to the memory of Dmitry Aleksandrovich Zavalishin (1900–1968) – a Russian engineer, professor, and scientist that was one of the initiators and leaders of the Soviet electric power industry. The conference encouraged communication and future cooperation with colleagues in other countries. Main themes included algebra and functional analysis, dynamical systems, mathematical physics and partial differential equations, probability theory and mathematical statistics, and systems engineering and electrical engineering, mechatronics, robotics, automation and vibration technologies. The conference was held with XX International Conference "Vibration 2021: Vibration Technologies, Mechatronics and Controlled Machines" and VIII International Conference "Electric Drive, Electromechanical and Electrical Equipment of Enterprises", and was organized by the St. Petersburg State University of Aerospace Instrumentation (SPbPU), St. Petersburg Federal Research Center of the Russian Academy of Sciences (SPbFRC RAS), and Leningrad State Oil Technical University (OSPU).

Topological Groups / R. V. Gamkrelidze 2014-05-15 Offering the insights of L.S. Pontryagin, one of the foremost thinkers in modern mathematics, the second volume in this four-volume series examines the nature and processes that make up topological groups. Aligned as the leading text in this subject for the abundance of examples and its thorough explanations, the text is arranged so that modern readers can follow the material in a relatively straightforward manner. Stand-alone chapters cover such topics as topological division rings, linear representations of compact topological groups, and the concept of a Lie group.

Books in Print - 1985

Kolmogorov in Perspective / American Mathematical Society 2000 The editors of the History of Mathematics series have selected for this volume a series of translations from two Russian publications, Kolmogorov in Remembrance and Mathematics and its Historical Development. This book, Kolmogorov in Perspective, includes articles written by Kolmogorov's students and colleagues and his personal accounts of shared experiences and lifelong mathematical friendships. The articles combine to give an excellent personal and scientific biography of this important mathematician. There is also an extensive bibliography with the complete list of Kolmogorov's works—including the articles written for encyclopedias and newspapers. The book is illustrated with photographs and includes quotations from Kolmogorov's letters and conversations, uniquely reflecting his mathematical tastes and opinions.

Differential Equations and Dynamical Systems / Abdus Salam 2010-10-20 This book features papers presented during a special session on dynamical systems, mathematical physics, and partial differential equations. Research articles are devoted to broad classes of models and methods such as qualitative theory of dynamical systems, theory of games, circle diffeomorphisms, semilinear wave and Schrodinger equations, quasilinear parabolic equations, quasilinear dynamical systems, bifurcations, and invariant manifolds. Featuring a variety of topics from dynamical properties to stochastic properties of dynamical systems, this volume includes discussions on discrete-continuous coorbiting, comparison between two critical circle maps, non-linear systems, and the central limit theorem. Applications to game theory and networks are also included. Graduate students and researchers in various fields of pure and applied mathematics and physics will find this book useful for teaching and research.

Ordinary Differential Equations / L. S. Pontryagin 2014-05-15 Ordinary Differential Equations presents the study 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 Laplace transform. 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.
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