



CATALOGUE

# MATHEMATICS

## 2014

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# MATHEMATICS



## ARTIFICIAL INTELLIGENCE

*L. N. Jasnitsky*

*ISBN 978-5-9963-0234-5*

*197 pp., hardcover*

*145 x 215 mm*

*2011*

The aim of the manual is to introduce to schoolchildren artificial intelligence history, and basic strategies applied at creation of intellectual information systems; to teach how to use neural network technologies and apply them while solving practical problems.

The manual is intended for senior pupils of information-technological, physical and mathematical, natural-scientific, socially-humanitarian schools.



## AUTONOMOUS ARTIFICIAL INTELLIGENCE, 2<sup>nd</sup> ED.

*A. A. Zhdanov*

*ISBN 978-5-94774-995-3*

*359 pp., hardcover*

*179 x 240 mm*

*2009*

The author logically reasons about goal functions and organization of the nervous systems which are enforced by the conditions in which a nervous system lives. Starting from philosophical-rational motivation the author proceeds directly to giving exact engineering descriptions of functions, structures and integrated circuits of nervous system models, and so forth, followed by program simulations

of the nervous systems and development of application systems prototypes. Such constructive approach defines important theoretical value of the book. As a practical result, the book yields a way to create self-learning machines similar to newborn alive creatures, step by step adapting to the given reality. The development in this direction leads to occurrence of systems of "Autonomous Artificial Intelligence" which is a newborn self-learning machine capable of achieving high level of intelligence at a mature age.

The book is intended for students and teachers, scientists and engineers and for all who are interested in the subject.

**Alexander A. Zhdanov** Professor, Doctor of Physical and Mathematical Sciences, the head of department of the Institute of System Programming of the Russian Academy of Sciences.



### **BASES OF INFORMATION THEORY, 3<sup>rd</sup> ED.**

*V. V. Panin*

*ISBN 978-5-9963-0013-6*

*438 pp.*

*165 x 235 mm, hardcover*

*2009*

The book presents a regular statement of issues concerning the classical information theory. A reader would find distinctions in methods of this theory construction by K. Shannon and S. Goldman. The author gives a uniform interpretation of classical information theory construction based on the above mentioned mutually supplementing methods.

The book is intended for graduate and post-graduate students, teachers and the engineers.

**Valerian V. Panin** Ph. D. in Engineering, Professor of the MEPhI. The author of 80 scientific works and 24 copyright certificates on inventions.



### **BASES OF THE GAMES THEORY: THE MANUAL**

*L. V. Kolobashkina*

*ISBN 978-5-9963-0334-2*

*164 pp., hardcover*

*145 x 215 mm*

*2011*

The manual contains the basic aspects of the games theory and describes how to choose optimum strategy of behavior in antagonistic and nonantagonistic conflicts. It also presents criteria of optimum strategy in «games with the nature» definition. Decision-making methods in antagonistic and nonantagonistic positional games with complete and incomplete information are considered. All presented methods

are accompanied by detailed examples. The book is written in accessible and clear language which makes the acquaintance to principles of rational behavior in conflicts understandable for a wide range of readers.

The manual is intended for students of the higher educational institutions mastering such disciplines as «Applied Mathematics», «Applied Mathematics and Informatics», «Mathematical Methods in Economy».



### **COLLECTION OF PROBLEMS ON DIFFERENTIAL EQUATIONS AND VARIATIONS CALCULUS, 3<sup>RD</sup> ED., REV.**

*V. K. Romanko [etc.], V. K. Romanko (ed.)*

ISBN 978-5-9963-0652-7

219 pp., *hardcover*

165 x 235 mm

2012

The book provides practical training on the course "Differential Equations and Variations Calculus". At the beginning of each section a reader would find typical problems' solutions and answers.

The book is intended for students of the mathematics, engineering physics and economics specialties.



### **COURSE OF MATHEMATICAL ANALYSIS, 4<sup>th</sup> ED.**

*A. M. Ter-Krikorov, M. I. Shabunin*

ISBN 978-5-94774-993-9

672 pp.

145 x 215 mm, *hardcover*

2009

The book presents a theoretical material which is illustrated by typical examples. Special attention is given to difficult sections of the mathematical analysis course (uniform convergence of functional numbers and integrals depending on parameter, uniform continuity of functions, etc.).

The book is intended for students of physical, mathematical and engineering-physical specialties and can be used for self education.

**Michael I. Shabunin** Doctor of Pedagogical Sciences, Professor of the Moscow Institute of Physics and Technology. The author of over 200 scientific and methodical works, textbooks and collections of problems.



## GEOMETRY 1 : TEXTBOOK FOR UNIVERSITIES

*S. L. Atanasyan, V. G. Pokrovsky, edited by S. L. Atanasyan*

*ISBN 978-5-9963-1531-4*

*331 pp., hardcover*

*145 x 215 mm*

**2014**

The textbook contains material on the first part of the geometry course, the study of which is necessary to the future mathematics teachers to work successfully with students. The theoretical material is illustrated by typical examples.

The book is intended for university students and teachers.



## ITERATIVE METHODS OF SOLVING SADDLE PROBLEMS

*U. V. Bychenkov, E. V. Chizhonkov*

*ISBN 978-5-9963-0118-8*

*349 pp., hardcover*

*145 x 215 mm*

**2010**

For the first time all known iterative methods for the large scale block structure linear algebraic equations which have the saddle point as the solution are considered in this book. The book provides detailed analysis of the ideas of construction, condition of convergence and optimization issues. The analysis results are presented in the form of formulae convenient for use. The appendix is

focused on application of theory for numerical modeling in hydrodynamics and adjacent areas.

The book is intended for scientists in the field of calculus mathematics, graduate and post-graduate students, and also for engineers and researchers in applied fields.

**Jury V. Bychenkov** Ph.D. in Physics and Mathematics, employee of Mechanical and Mathematical Faculty of the Lomonosov Moscow State University.

**Evgeny V. Chizhonkov** Ph.D. in Physics and Mathematics, Professor of the Lomonosov Moscow State University.



### **LINEAR ALGEBRA. A COMPUTER PRACTICAL TRAINING SESSION, 2<sup>nd</sup> ED.**

*V. A. Bubnov, G. S. Tolstov, O. E. Klemeshova*

*ISBN 5-93208-171-6*

*168 pp.*

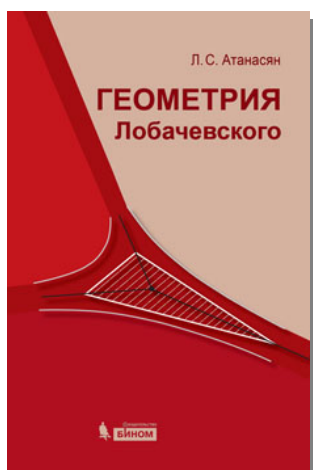
*145 x 215 mm, softcover*

*2009*

Following problems of linear algebra are included in the manual: calculation of the third order determinants, calculation of the fourth order determinants by decomposition on elements of a line (column), calculation of a rank of a matrix, multiplication of matrixes, calculation of a return matrix, the solving of systems of the linear equations by Gaussa' methods, Kramer's formula and in a matrix kind, and also a finding of own values of the linear operator. Calculation of all listed

problems is made with Microsoft Excel programme.

The book is intended for students, teachers of the higher educational institutions, who study theoretical bases of mathematics and computer science.



### **THE LOBACHEVSKY GEOMETRY, 2<sup>ND</sup> ED., REV.**

*L. S. Atanasyan*

*ISBN 978-5-9963-0814-9*

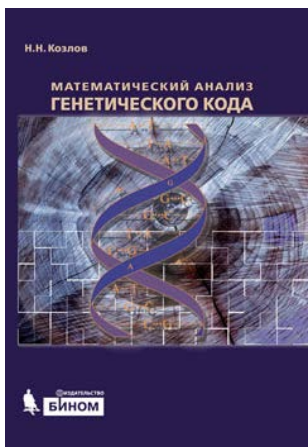
*464 pp., hardcover*

*145 x 215 mm*

**2014**

The author presents the Lobachevsky geometry on the basis of school absolute geometry axiomatics and the Lobachevsky axiom. The first part of the book focuses on the Lobachevsky plane geometry, and the second one on the stereometry. Each chapter contains problems; the answers and guidance to them are given in the appendix. This book differs favorably from the other tutorials on the Lobachevsky geometry.

The book can be successfully used by teacher training and university students and teachers. It will also be useful to high school mathematics teachers in arranging individual work with students interested in mathematics.



## MATHEMATICAL ANALYSIS OF THE GENETIC CODE

*N. N. Kozlov*

*ISBN 978-5-9963-0119-5*

*215 pp. + 8 pp, hardcover*

*145 x 215 mm*

*2010*

New properties of the genetic code, two major groups of its integrated characteristics and their interrelation are figured in the monograph. The book provides an analysis of the set of currently known genes, including human genome, as well as description of a number of unknown before effects.

The book is intended for scientists, teachers and graduate students specializing in the field of mathematical modeling in natural sciences.

**Nikolay N. Kozlov** Doctor of Physical and Mathematical Sciences, main scientist of the M.V. Keldysh Institute of Applied Mathematics (the Russian Academy of Sciences).



## MATHEMATICAL METHODS IN BUSINESS AND MANAGEMENT: A MANUAL, 2<sup>nd</sup> ED.

*V. V. Pokrovsky*

*ISBN 978-5-94774-832-1*

*110 pp., hardcover*

*145 x 215 mm*

*2011*

The manual presents methods of linear programming and mathematical statistics, allowing businessmen to take optimal decisions under the market economy conditions. The technique of mathematical models construction, graphic and numerical solving of optimization problems in MS Excel are described. Algorithms of computer processing of statistical criteria are offered. One chapter contains

problems and exercises; most difficult of them are given with solutions.

The manual is intended for university students and teachers.



## MATHEMATICAL AND COMPUTING PROBLEMS OF MAGNETIC GAS-DYNAMICS

*K. V. Brushlinsky*

ISBN 978-5-94774-898-7

200 pp.

145 x 215 mm, hardcover

2009

The monograph concerns actual area of mathematical modeling in modern problems of dense plasma physics. Mathematical questions of magnetic gas-dynamics, numerical models of corresponding physical processes are presented. At research of two-dimensional mhd-flows special attention is given to a role and modeling of the Hall' effect. Features of the numerical decision of mhd-problems

are discussed. A reader would find examples of calculations of magnetic traps for plasma deduction and detailed review of plasma acceleration models by a magnetic field in channels.

The book is intended for scientists, post-graduate students, specialists.

**Konstantin V. Brushlinsky** Doctor of Physical and Mathematical Sciences, Professor, the main scientific employee of the M. V. Keldysh Institute of Applied Mathematics (the Russian Academy of Sciences). The author of more than 150 scientific works.



## MATHEMATICAL MODELS IN IMMUNOLOGY AND INFECTIOUS DISEASE EPIDEMIOLOGY

*A. A. Romanyukha*

ISBN 978-5-94774-900-7

293 pp.

165 x 235 mm, hardcover

2011

*(Mathematical Modeling)*

This monograph is devoted to the construction and investigation of mathematical models of immunological and epidemiological process during infectious diseases.

The author describes the phenomena of training, adaptation and aging of immune system, formation of immune deficiencies, their dependence on the level of

infection and other environmental factors. The reader would read about the method for assessing the quality of the immune system. The book includes description of epidemiological and demographic processes relations. The models are based on current knowledge about the pathogenesis and epidemiology of such diseases as influenza, pneumonia, tuberculosis.

For experts in the field of applied mathematics, immunology and epidemiology, as well as for undergraduate and graduate students in related disciplines.



# ON MATHEMATICS AND MATHEMATICIANS. 2<sup>ND</sup> ED., REV. AND ADD.

*B. M. Pisarevsky, V. T. Harin*

*ISBN 978-5-9963-0631-2*

*302 pp., hardcover*

*145 x 215 mm*

*2012*

The book focuses on the role of mathematics in man's knowledge of the outside world. The author describes the achievements of modern mathematics using as an example creative biographies of three outstanding Russian mathematicians of the XX century as A. N. Kolmogorov, S. L. Sobolev and A. N. Tikhonov.

The book will be interesting for students, teachers and tutors of mathematics and, as well as for everybody interested in this science.



# PRACTICAL TRAINING SESSION ON HIGHER MATHEMATIC

*L. I. Djuzhenkova, O. J. Djuzhenkova, G. A. Mihalina*

*ISBN 978-5-94774-335-7*

*ISBN 978-5-94774-998-4 (V.1)*

*ISBN 978-5-94774-999-1 (V. 2)*

*145 x 215 mm, hardcover*

*2009*

The book presents all basic sections of higher mathematics: elements of the mathematical analysis, linear algebra, analytical geometry, probability theory and mathematical statistics. Each section contains an extensive list of problems which is premised with the background theoretical material and illustrative examples. Answers are given in the end of the book.

The book is intended for students and teachers of technical, economic, pedagogical and agricultural higher schools.



## PROBABILITY AND STATISTICS

*V. B. Monsik*

ISBN 978-5-9963-0637-4

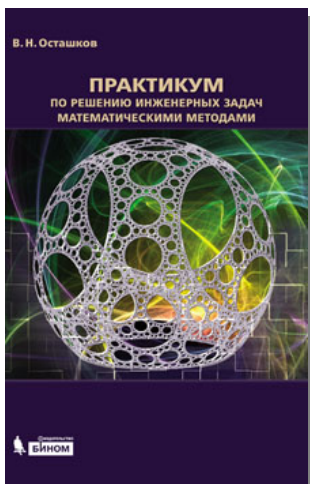
381 pp., hardcover

145 x 215 mm

2011

The manual describes theoretical bases and applied methods of probability theory and mathematical statistics. It provides an annual course of studying the discipline "The probability theory and the mathematical statistics". The theory is illustrated by many drawings, interesting numerical examples and applied problems.

The manual is intended for university students of engineering specialties.



## SOLVING ENGINEERING PROBLEMS USING MATHEMATICAL METHODS: A MANUAL

*V. N. Ostashkov*

ISBN 978-5-9963-0628-2

200 pp., hardcover

145 x 215 mm

2013

*(Mathematic Modeling)*

The author analyzes the heuristic methods of working and solving professionally-oriented tasks, discusses the problems of understanding their own feelings during research and creative processes. The manual can be used as an addition to existing tutorials on maths.

The book is intended for students and teachers of technical universities.



## THE ANALYSIS OF MATHEMATICAL MODELS: SYSTEMS OF PRESERVATION LAWS, BOLTSMAN' AND SMOLUHOVSKY' EQUATIONS

V. A. Galkin

ISBN 978-5-94774-901-4

408 pp.

145 x 215 mm, hardcover

2009

The monograph is devoted to the issues of problems correctness substantiation for nonlinear equations systems which have applied value in mathematical physics. The contents is directed on revealing and analysis of the basic mathematical structures connected with issues of mathematical modeling methods substantiation, leading to nonlinear systems of preservation laws including Nave-Stoks' system of gas dynamics, Boltsman', Smoluhovsky', Vlasov' equations in physical kinetics. Also Stefan' problem and heat-and-mass transfer models, connected with a crystals cultivation are described.

The book is intended for experts in the field of applied mathematics, physical kinetics and gas dynamics, and also for graduate and post-graduate students of corresponding specialties.

**Valery A. Galkin** Doctor of Physical and Mathematical Sciences, Professor of the Obninsk State Technical University for Nuclear Power Engineering. The expert in the field of mathematical modeling and calculations in physical kinetics, theories of preservation laws. The author of over 120 scientific works. The organizer of the international conferences «P. L. Chebysheva's Mathematical Ideas and their Application to Modern Problems of Natural Sciences».



## THE STATISTICAL DATA ANALYSIS IN PSYCHOLOGY

V. K. Romanko

ISBN 978-5-94774-849-9

312 pp.

145 x 215 mm, hardcover

2009

The present manual interprets the basic mathematical methods offered by the mathematical theory and widely put into practice in modern psychology-pedagogical researches. The basic concepts of probability theory are stated and concrete mathematical methods of data processing are described. A reader would find general recommendations about statistical software packages usage. The statement is conducted practically without strict mathematical proofs, but with detailed discussions, explanations and illustrations. Essence and applicability borders for specific statistical analysis methods are explained. The book is intended for students and teachers of higher schools.



## **TURBULENCE AND SELF-ORGANIZATION.**

### **PROBLEMS OF SPACE AND ENVIRONMENTS MODELING**

*A. V. Kolesnichenko, M. J. Marov*

*ISBN 978-5-94774-899-4*

*632 pp.*

*165 x 235 mm, hardcover*

*2009*

The monograph is devoted to the development of turbulence environments continual models — the ones which underly statements and numerical calculations of problems, connected with formation, structure and evolution of various astro- and geophysical objects. Stochastic modeling approaches to corresponding problems are considered as reflection of self-organizing processes in dissipative open systems. A reader would find the examples of orderliness origins in different objects and environments in the course of their evolution. The book is intended for scientists in fields of astrophysics, geophysics, planetology, aeronomy and space researches, and also for graduate and post-graduate students.

**Alexander V. Kolesnichenko** Professor, Doctor of Physical and Mathematical Sciences, the head of department of the M. V. Keldysh Institute of Applied Mathematics (the Russian Academy of Sciences). The expert in the area of continuous environments mechanics, theories of turbulence, thermodynamics of irreversible processes, planetary researches and kosmogonie. The author of over 160 scientific works and 4 monographs.

**Michael J. Marov** Academician of the Russian Academy of Sciences, Doctor of Physical and Mathematical Sciences, Professor. The head of department of the Vernadsky Institute of Geochemistry and Analytical Chemistry (Russian Academy of Sciences) and the main scientific employee of the M. V. Keldysh Institute of Applied Mathematics (the Russian Academy of Sciences). The expert in area of continuous environments mechanics, nonequilibrium kinetic processes, planetary researches and kosmogonie. The author of over 220 scientific works and 12 monographs.



## **VIVID MATHEMATICAL STATISTICS, 2<sup>nd</sup> ED.**

*M. B. Lagutin*

*ISBN 978-5-94774-996-0*

*472 pp., hardcover*

*170 x 240mm*

*2009*

This book primarily is a collection of interesting probability paradoxes and examples, gathered from many books and articles. The author's aim was to give a comprehensive presentation of the subject in entertaining manner. The book includes more than 300 pictures, 150 epigraphs, many test questions and numeric examples.

The first part of the book can be used as an introduction to the theory of probability. Most difficult theorems are not proven, but explained, illustrated and the readers are walked though these as they attempt to solve the problems. The second part of the book is devoted to mathematical statistics: parameter estimation and hypothesis

testing. All included problems have detailed solutions. The third part of the book contains sample problems for the most important methods and algorithms, such as nonparametric ANOVA (analysis of variance), principal components, hierarchical classification, rank correlation and regression.

The author is a professor of the Lomonosov Moscow State University.

The book is intended for undergraduate students.

# THE BKL PUBLISHERS

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Many of our editors worked previously in the MIR Publishers which proved to be famous for high quality of its translated scientific editions since the Soviet era. Therefore it is no wonder that the BKL Publishers is always perfectly presented at the international book fairs in Moscow, Frankfurt, Beijing, Jerusalem, Madrid, London, Bologna, Turin etc.

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