Аннотация

монографии В.В.Колбина « Оценка и управление риском», 256 страниц, опубликованной в 2014 году издательством Palmarium Academic Publishing (Германия).

Рассматриваются проблемы принятия решений в условиях риска и неопределенности. Вводятся понятия степеней и мер риска, обсуждается проблема описания предпочтений на множестве вероятностных распределений, приводится задача распределения ресурсов. Рассматриваются страховые портфели, определяется цена страхования и время жизни процессов риска. Рассчитывается вероятность по портфелю страховых договоров, приведены динамические процессы риска. Описан риск в финансовых моделях и стохастическое доминирование основных функций инвестиционного проекта. Приведены методы оценки риска, модели разорения страховых компаний, перестрахования. Показана связь степеней рисковости и функций ожидаемой полезности. В основе работы лежат материалы специального курса лекций, читаемых в СПбГУ на факультете Прикладной математики – процессов управления.

Abstract

V.V.Kolbin «Risk Assessment and Management», 256 page monograph published by Palmarium Academic Publishing (Germany), 2014.

Problems are reviewed of decision making under the conditions of risk and indeterminacy. Concepts are introduced of risk degree and measure, the problem is discussed of describing preferences over a set of probabilistic distributions, and the task of distributing resources is presented. Insurance portfolios are considered, insurance price is defined and lifetime of risk processes. Probability is calculated over a portfolio of insurance agreements, dynamic risk processes are presented. Risk is described for financial models, plus stochastic domination of principal functions of investment projects. Techniques are described of risk assessment, models of insurance companies going broke or re-insured. Connection is demonstrated between the level of risk and the function of expected utility. The study is based on materials of a dedicated lecture course offered at the Faculty of Applied Mathematics and Management Processes, St.Petersburg State University.

Аннотация

монографии В.В.Колбина « Стохастическое программирование», 390 страниц,

опубликованной в 2013 году издательством « Palmarium Academic Publishing»,
(Германия).

   Модели и методы математического программирования в условиях дефицита
информации используются в технике, экономике, биологии, военном деле и
других областях человеческой деятельности. Стохастическое
программирование адекватнее других современных формальных методов

способны анализировать сложные системы, вырабатывать оптимальные и
компромиссные решения. В монографии представлены одноэтапные,
двухэтапные и многоэтапные модели с вероятностными условиями и
функционалами, многокритериальные и игровые постановки задач. Приведены
методы оптимизации соответствующих эквивалентов исходных моделей.

Исследованы проблемы устойчивости решений и целевых функционалов.

Работа содержит большое число прикладных задач в условиях дефицита
информации. В основу монографии положены материалы лекций специального
курса « Стохастическое программирование», читающегося автором с 1967 года

студентам и аспирантам Ленинградского (Санкт – Петербургского)
государственного университета. Библиография и дополнительный список
литературы насчитывает 660 наименований.

Stochastic Programming.Vyacheslav V.Kolbin.Saint-Petersburg State University(Russia)

Methodology of investigation and optimization of goal-oriented systems employs nondeterministic devices as those utilized in natural science. Here stochastic programming is taken as the class of chance-constrained optimization models and methods which takes on great significance.

Our major concern is how to formulate those problems that are generally ill-defined and give rise to more significant difficultes than those involved in investigation and optimization of their models. The existence and uniqueness (in a sense) conditions are provided for solutions (optimization) of suitable models. Implementation procedures are proposed and their convergence statements are proved. Consideration is given to the properties of solutions and objective functionals in probability models with the emphasis on stability problems. Specific models are provided for optimization of systems under incomplete information.

The concluding part of this monograph deals with optimization models on fuzzy sets and in function spaces.

This monograph builds on the course of lectures the author has delivered to students and post-graduates of the State University in Leningrad (St. Petersburg), as from 1966 ("Stochastic Programming") to this date ("Mathematical Decision Theory")

Аннотация

монографии В.В.Колбина «Теория решений», 640 страниц, опубликованной

в 2013 году издательством « Palmarium Academic Publishing», (Германия).

В монографии представлены математические модели, методы и подходы в теории принятия решений общественно значимых проблем. Каждая из четырех частей работы представляют собой широкую область исследований аксиоматических основ предпочтений на языке бинарных отношений. Рассмотрены многочисленные типы задач принятия решений в условиях неполной, нечеткой и нечисловой информации, которые возникают в практической деятельности отдельного лица или группы лиц. Исследуются многоэтапные и (или) многоцелевые и (или) многоэкстремальные задачи, позволяющие наиболее адекватно описывать реальные управленческие ситуации, требующие принятия решений. В основе монографии лежат материалы специального курса лекций « Математическая теория решений», читаемого на кафедре « Математической теории экономических решений» Санкт – Петербургского государственного университета с 2000 года для студентов, магистров и аспирантов.

Theory of Decision. Vyacheslav V. Kolbin. Saint-Petersburg State University (Russia)

The problem of choosing alternatives or the problem of decision making in modern world becomes the most important class of problems that is a common occurrence in everyday life of businessmen and researchers, doctors and engineers, people in their life. Mathematics, especially when equipped with the computation and information aids, can be crucial to the analysis of the relevant problems. However, it is also important to apply mathematical tools in accordance with their capabilities without overestimating or depreciating the role of mathematics and mathematicians in the decision-making process.

It is difficult to imagine a complex system in almost any sphere of activities which is not characterized by a conflict of interests of the parties involved. The description of conflict management using the methods of applied mathematics as well as the development of the optimality principles and algorithms for finding optimal solutions form the basis of methodology. Based on its application, and with the participation of specialists from other fields of science, new approaches are developed to solve a variety of decision problems in various organizational systems. The problems being solved include the establishment of a strategic parity in military affairs, the rating of harmful emissions, the collective environmental safety, the exploitation of biological resources, the development of voting procedures, etc.

The content of mathematics can be characterized as a system of formal sign models for the real world. Mathematical applications include the description of various phenomena and processes in the formal language as well as the use of formal and logical tools to develop the best (in one sense or another) interventions in real processes, elaborate reasonable actions, and forecast the development of phenomena of the objective world.

Applied mathematics does not examine the solutions in general, but the optimal solutions, in which case the preimages of optimality can be the objective rationality, expediency, profitability, feasibility, fairness, stability and other concepts displayed by mathematical aids.

In the solution of real-world problems, it is essential that the optimality principle being selected in a model agree with the participants' real notions of optimality. Conflicts may occur between individuals, groups of individuals united by various attributes, classes, fighting parties, movements, blocks, and economic or political partners or opponents. The conflict can be viewed as a struggle against

Nature where the latter is a participant. The science has not yet developed the general conceptual theory that is universal, i.e. covers equally all types of conflicts in the above sense.

The sciences almost entirely concentrated on conflicts, where applied mathematics is successfully used, are the law, military science, many branches of economics, sociology, political science, and psychology. There are good grounds to believe that medicine and some branches of biology and ethics can also be entered in this list.

The science is expected to assist in the solution of two main problems arising in any human community, and the development of the human community is judged by how these problems are solved. The main problems of the community are: creation of something and allocation of the results. Any human society faces the problem of how to produce more goods by utilizing the natural and intellectual potential so that the life of people is made more convenient, comfortable, attractive. Here the problems of allocation of resources are solved for consumption and accumulation.

One might say that creation of goods and modification of Nature are largely due to the use of knowledge and experience accumulated by natural and engineering sciences. The solution of allocation problems is primarily related to liberal arts, such as economics, sociology, political science, and social psychology attempting to find a mechanism of reasonable internal organization of the community. Depending on what is the human society, one may judge about the practical achievements of liberal arts and their influence on the consciousness of people and society as whole.

The principles of goods allocation are based on some notions of fairness. When the majority of members of the human community reject the fairness of the operating principles of allocation, the society in its existing form ceases to exist or loses very important means to maintain the suppression and penal system. Many principles of fairness have been developed throughout the history of human communities. Any society attempts to prove the fairness of the operating system of allocation of goods and seeks to improve this system on the basis of its understanding.

Applied mathematics, and primarily decision theory, allows the formulation of ethical categories in the form of relevant statements. Discussion of the fairness principles generally causes a violent and emotional mass reaction. Contemporary life demonstrates numerous examples of how the public opinion can be easily manipulated in the discussion of the category of fairness, and the relevant mechanisms for allocation of benefits and costs.