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This two-volume work functions both as a textbook for graduates and as a reference for economic scholars. Assuming only the minimal mathematics background required of every second-year graduate in economics, the two volumes provide a self-contained and careful development of mathematics through locally convex topological vector spaces, and fixed-point, separation, and selection theorems in such spaces. This second volume introduces general topology, the theory of correspondences on and into topological spaces, Banach spaces, topological vector spaces, and maximum, fixed-point, and selection theorems for such spaces Despite numerous books on research methodology, many have failed to present a complete, hands-on, practical book to lead college classes or individuals through the research process. We are seeing more and more scientific papers from all research fields that fail to meet the basic criteria in terms of research methods, as well as the structure, writing style and presentation of results. This book aims to address this gap in the market by providing an authoritative, easy to follow guide to research methods and how to apply them. Qualitative Methods in Economics is focused not only on the research methods/techniques but also the methodology. The main objective of this book is to discuss qualitative methods and their use in economics and social science research. Chapters identify several of the research approaches commonly used in social studies, from the importance of the role of science through to the techniques of data collection. Using an example research paper to examine the methods used to present the research, the second half of this book breaks down how to present and format your results successfully. This book will be of use to students and researchers who want to improve their research methods and read up on the new and cutting edge advances in research methods, as well as those who like to study ways to improve the research process. Optimal Transport Methods in Economics is the first textbook on the subject written especially for students and researchers in economics. Optimal transport theory is used widely to solve problems in mathematics and some areas of the sciences, but it can also be used to understand a range of problems in applied economics, such as the matching between job seekers and jobs, the determinants of real estate prices, and the formation of matrimonial unions. This is the first text to develop clear applications of optimal transport to economic modeling, statistics, and econometrics. It covers the basic results of the theory as well as their relations to linear programming, network flow problems, convex analysis, and computational geometry. Emphasizing computational methods, it also includes programming examples that provide details on implementation. Applications include discrete choice models, models of differential demand, and quantile-based statistical estimation methods, as well as asset pricing models. Authoritative and accessible, Optimal Transport Methods in Economics also features numerous exercises throughout that help you develop your mathematical agility, deepen your computational skills, and strengthen your economic intuition. The first introduction to the subject written especially for economists Includes programming examples Features numerous exercises throughout Ideal for students and researchers alike In recent years, the usual optimization techniques, which have proved so useful in microeconomic theory, have been extended to incorporate more powerful topological and differential methods, and these methods have led to new results on the qualitative behavior of general economic and political systems. These developments have necessarily resulted in an increase in the degree of formalism in the publications in the academic journals. This formalism can often deter graduate students. The progression of ideas presented in this book will familiarize the student with the geometric concepts underlying these topological methods, and, as a result, make mathematical economics, general equilibrium theory, and social choice theory more accessible. To harness the full power of computer technology, economists need to use a broad range of mathematical techniques. In this book, Kenneth Judd presents techniques from the numerical analysis and applied mathematics literatures and shows how to use them in economic analyses. The book is divided into five parts. Part I provides a general introduction. Part II presents basics from numerical analysis on R^n, including linear equations, iterative methods, optimization, nonlinear equations, approximation methods, numerical integration and differentiation, and Monte Carlo methods. Part III covers methods for dynamic problems, including finite difference methods, projection methods, and numerical dynamic programming. Part IV covers perturbation and asymptotic solution methods. Finally, Part V covers applications to dynamic equilibrium analysis, including solution methods for perfect foresight models and rational expectation models. A website contains supplementary material including programs and answers to exercises. This volume on financial and economic simulations in Swarmmarks the continued progress by a group of researchers to incorporateagent-based computer models as an important tool within theirdiscipline.Swarm promotes agent-based computer models as a tool for the study ofcomplex systems. A common "language" is leading to the growth ofuser communities in specific areas of application. Furthermore, byproviding an organizing framework to guide the development of moreproblem-specific structures, and by dealing with a whole range ofissues that affect their fundamental correctness and their ability tobe developed and reused, Swarm has sought to make the use ofagent-based models a legitimate tool of scientific investigation thatalso meets the practical needs of investigators within acommunity.Swarm's principal foundation is an object-oriented representation ofactive agents interacting among themselves and with their environment.To this base layer it adds its own structures to drive, record andportrait the events that occur across this world. The specificcontents of any world, however, are up to the experimenter to provide, either by building them from scratch or by tapping previouscontributions.This book is notable in assembling a rich array of such contributions, which are significant in their own right, but which can also be minedto extract the reusable elements in their respective areas of financeand economics. It also presents three interesting software additionswith tutorials in the form of simple financial and economicapplications. A Swarm meta-language closer to a natural language', the use of internet-augmented Swarm for experimental economics, and aSwarm visual builder will meet thechallenges launched by otheragent-based modelling competitors.The Swarm community at large can benefit greatly from the lead thatthe growing field of computational economics is taking to address itsown needs, as represented by th This textbook articulates the elements of good craftsmanship in applied microeconomic research and demonstrates its effectiveness with multiple examples from economic literature. Empirical economic research is a combination of several elements: theory, econometric modelling, institutional analysis, data handling, estimation, inference, and interpretation. A large body of work demonstrates how to do many of these things correctly, but to date, there is no central resource available which articulates the essential principles involved and ties them together. In showing how these research elements can be best blended to maximize the credibility and impact of the findings that result, this book presents a basic framework for thinking about craftsmanship. This framework lays out the proper context within which the researcher should view the analysis, involving institutional factors, complementary policy instruments, and competing hypotheses that can influence or explain the phenomena being studied. It also emphasizes the interconnectedness of theory, econometric modeling, data, estimation, inference, and interpretation, arguing that good craftsmanship requires strong links between each. Once the framework has been set, the book devotes a chapter to each element of the analysis, providing robust instruction for each case. Assuming a working knowledge of econometrics, this text is aimed at graduate students and early-career academic researchers as well as empirical economists looking to improve their technique. This book presents recent research on probabilistic

methods in economics, from machine learning to statistical analysis. Economics is a very important – and at the same a very difficult discipline. It is not easy to predict how an economy will evolve or to identify the measures needed to make an economy prosper. One of the main reasons for this is the high level of uncertainty: different difficult-to-predict events can influence the future economic behavior. To make good predictions and reasonable recommendations, this uncertainty has to be taken into account. In the past, most related research results were based on using traditional techniques from probability and statistics, such as p-value-based hypothesis testing. These techniques led to numerous successful applications, but in the last decades, several examples have emerged showing that these techniques often lead to unreliable and inaccurate predictions. It is therefore necessary to come up with new techniques for processing the corresponding uncertainty that go beyond the traditional probabilistic techniques. This book focuses on such techniques, their economic applications and the remaining challenges, presenting both related theoretical developments and their practical applications. This book describes a system of mathematical models and methods that can be used to analyze real economic and managerial decisions and to improve their effectiveness. Application areas include: management of development and operation budgets, assessment and management of economic systems using an energy entropy approach, equation of exchange rates and forecasting foreign exchange operations, evaluation of innovative projects, monitoring of governmental programs, risk management of investment processes, decisions on the allocation of resources, and identification of competitive industrial clusters. The proposed methods and models were tested on the example of Kazakhstan’s economy, but the generated solutions will be useful for applications at other levels and in other countries. Regarding your book "Mathematical Methods and Models in Economics", I am impressed because now it is time when "econometrics" is becoming more appreciated by economists and by schools that are the hosts or employers of modern economists. ... Your presented results really impressed me. John F. Nash, Jr., Princeton University, Nobel Memorial Prize in Economic Sciences The book is within my scope of interest because of its novelty and practicality. First, there is a need for realistic modeling of complex systems, both natural and artificial that conclude computer and economic systems. There has been an ongoing effort in developing models dealing with complexity and incomplete knowledge. Consequently, it is clear to recognize the contribution of Mutanov to encapsulate economic modeling with emphasis on budgeting and innovation. Secondly, the method proposed by Mutanov has been verified by applying to the case of the Republic of Kazakhstan, with her vibrant emerging economy. Thirdly, Chapter 5 of the book is of particular interest for the computer technology community because it deals with innovation. In summary, the book of Mutanov should become one of the outstanding recognized pragmatic guides for dealing with innovative systems. Andrzej Rucinski, University of New Hampshire This book is unique in its theoretical findings and practical applicability. The book is an illuminating study based on an applied mathematical model which uses methods such as linear programming and input-output analysis. Moreover, this work demonstrates the author’s great insight and academic brilliance in the fields of finance, technological innovations and marketing vis-à-vis the market economy. From both theoretical and practical standpoint, this work is indeed a great achievement. Yeon Cheon Oh, President of Seoul National University In recent years, the usual optimization techniques, which have proved so useful in microeconomic theory, have been extended to incorporate more powerful topological and differential methods, and these methods have led to new results on the qualitative behavior of general economic and political systems. These developments have necessarily resulted in an increase in the degree of formalism in the publications in the academic journals. This formalism can often deter graduate students. The progression of ideas presented in this book will familiarize the student with the geometric concepts underlying these topological methods, and, as a result, make mathematical economics, general equilibrium theory, and social choice theory more accessible. Economic Dynamics: Methods and Models aims to give a simple but comprehensive treatment of mathematical methods used in economic dynamics and show how they are utilized to build and to analyze dynamic models. The text also focuses on methods, and every mathematical technique introduced is followed by its application to selected models. The book is divided into three different parts. Part I: Different Equations discusses general principles; first-order, second-order, higher-order equations; simultaneous systems; and their economic applications. Part II: Differential Equations also discusses the same areas as those in Part I, but instead features differential equations, as what the section name suggests. Part III: More Advanced Material covers comparative statistics and the comparative principle; stability of equilibrium and Liapunov's second method; and linear mixed differential and difference equations, as well as its other related topics. The text is recommended for mathematicians and economists who have an idea on advanced mathematics and would like to know more about its applications in economics. How does your level of education affect your lifetime earnings profile? Will economic development lead to increased environmental degradation? How does the participation of women in the labor force differ across countries? How do college scholarship rules affect savings? Students come to economics wanting answers to questions like these. While these questions span different disciplines within economics, the methods used to address them draw on a common set of mathematical tools and techniques. The second edition of Mathematical Methods for Economics continues the tradition of the first edition by successfully teaching these tools and techniques through presenting them in conjunction with interesting and engaging economic applications. In fact, each of the questions posed above is the subject of an application in Mathematical Methods for Economics. The applications in the text provide students with an understanding of the use of mathematics in economics, an understanding that is difficult for students to grasp without numerous explicit examples. The applications also motivate the study of the material, develop mathematical comprehension and hone economic intuition. Mathematical Methods for Economics presents you with an opportunity to offer each economics major a resource that will enhance his or her education by providing tools that will open doors to understanding. Capital and Growth was published in 1965, and rapidly established itself as a landmark in economic theory. In this volume, Sir John takes his earlier work and examines it critically for its present-day value. The result is a substantially reworked book based on the first and best part of his 1965 publication. The theme, now more clearly identified, is a comparative study of the economics of change, and brings in many of Hicks's subsequent developments and refinements - in particular a 'neo-Austrian' theory of capital which he developed in Capital and Time(1973). A new chapter on Keynes's methods has been added. The sum is a more complete classification of the family of models appropriate for analysing dynamic economics. Provide a comprehensive treatment of the classical calculus of variations and its modern generalisations. This is the first book that examines the diverse range of experimental methods currently being used in the social sciences, gathering contributions by working economists engaged in experimentation, as well as by a political scientist, psychologists and philosophers of the social sciences. Until the mid-twentieth century, most economists believed that experiments in the economic sciences were impossible. But that’s hardly the case today, as evinced by the fact that Vernon Smith, an experimental economist, and Daniel Kahneman, a behavioral economist, won the Nobel Prize in Economics in 2002. However, the current use of experimental methods in economics is more diverse than is usually assumed. As the concept of experimentation underwent considerable abstraction throughout the twentieth century, the areas of the social sciences in which experiments are applied are expanding, creating renewed interest in, and multifaceted debates on, the way experimental methods are used. This book sheds new light on the diversity of experimental methodologies used in the social sciences. The topics covered include historical insights into the evolution of experimental methods; the necessary “performativity” of experiments, i.e., the dynamic interaction with the social contexts in which they are embedded; the application of causal inferences in the social sciences; a comparison of laboratory, field, and natural experiments; and the recent use of randomized controlled trials (RCTs) in development economics. Several chapters also deal with the latest heated debates, such as those concerning the use of the random lottery method in laboratory experiments. The first text to examine the use of qualitative research methods in health economics. It introduces students to the methods and demonstrates their application in case studies. This book presents different topics related to innovation, complexity, uncertainty, modeling and simulation, fuzzy logic, decision-making, aggregation operators, business and economic applications, among others. The chapters are the results of research presented at the International Workshop "Innovation, Complexity and Uncertainty in Economics and Business", held in Barcelona, in November 2019, by The Ibero-American Network for Competitiveness, Innovation and Development (REDCID in Spanish) and the Royal Academy of Economic and Financial Sciences (RACEF in Spanish). These papers are useful for junior and senior researchers in the area of economics and business. Health economics is concerned with the study of the cost-effectiveness of health care interventions. This book provides an overview of Bayesian methods for the analysis of health economic data. After an introduction to the basic economic concepts and methods of evaluation, it presents Bayesian statistics using accessible mathematics. The next chapters describe the theory and practice of cost-effectiveness analysis from a statistical viewpoint, and Bayesian computation, notably MCMC. The final chapter presents three detailed case studies covering cost-effectiveness analyses using individual data from clinical trials, evidence synthesis and hierarchical models and Markov models. The text uses WinBUGS and JAGS with datasets and code available online. The purpose of the Special Issue “Quantitative Methods in Economics and Finance” of the journal Risks was to provide a collection of papers that reflect the latest research and problems of pricing complex derivates, simulation pricing, analysis of financial markets, and volatility of exchange rates in the international context. This book can be used as a reference for academicians and researchers who would like to discuss and introduce new developments in the field of quantitative methods in economics and finance and explore applications of quantitative methods in other business areas. Capital and Growth was published in 1965, and rapidly established itself as a landmark in economic theory. In this volume, Sir John takes his earlier work and examines it critically for its present-day alue.

This volume offers a comprehensive review of experimental methods in economics. Its 21 chapters cover theoretical and practical issues such as incentives, theory and policy development, data analysis, recruitment, software and laboratory organization. The Handbook includes separate parts on procedures, field experiments and neuroeconomics, and provides the first methodological overview of replication studies and a novel set-valued equilibrium concept. As a whole, the combination of basic methods and current developments will aid both beginners and advanced experimental economists. This rigorous but brilliantly lucid book presents a self-contained treatment of modern economic dynamics. Stokey, Lucas, and Prescott develop the basic methods of recursive analysis and illustrate the many areas where they can usefully be applied. Contemporary economists, when analyzing economic behavior of people, need to use the diversity of research methods and modern ways of discovering knowledge. The increasing popularity of using economic experiments requires the use of IT tools and quantitative methods that facilitate the analysis of the research material obtained as a result of the experiments and the formulation of correct conclusions. This proceedings volume presents problems in contemporary economics and provides innovative solutions using a range of quantitative and experimental tools. Featuring selected contributions presented at the 2018 Computational Methods in Experimental Economics Conference (CMEE 2018), this book provides a modern economic perspective on such important issues as: sustainable development, consumption, production, national wealth, the silver economy, behavioral finance, economic and non-economic factors determining the behavior of household members, consumer preferences, social campaigns, and neuromarketing. International case studies are also offered. Originally published in 1984. Since the logic underlying economic theory can only be grasped fully by a thorough understanding of the mathematics, this book will be invaluable to economists wishing to understand vast areas of important research. It provides a basic introduction to the fundamental mathematical ideas of topology and calculus, and uses these to present modern singularity theory and recent results on the generic existence of isolated price equilibria in exchange economies. A textbook for a first-year PhD course in mathematics for economists and a reference for graduate students in economics. This volume presents a selection of the presentations from the first annual conference on Analytical Methods in Software Engineering Economics held at The MITRE Corporation in McLean, Virginia. The papers are representative of the issues that are of interest to researchers in the economics of information systems and software engineering economics. The 1990s are presenting software economists with a particularly difficult set of challenges. Because of budget considerations, the number of large new software development efforts is declining. The primary focus has shifted to issues relating to upgrading and migrating existing systems. In this environment, productivity enhancing methodologies and tools are of primary interest. The MITRE Software Engineering Analysis Conference was designed to address some of th,~ new and difficult challenges that face our profession. The primary objective of the conference was to address new theoretical and applications directions in Software Engineering Economics, a relatively new discipline that deals with the management and control of all segments of the software life-cycle. The discipline has received much visibility in the last twenty-five years because of the size and cost considerations of many software development and maintenance efforts, particularly in the Federal Government. We thank everyone who helped make this conference a success, especially those who graciously allowed us to include their work in this volume. Advanced Textbooks in Economics, Volume 1: Variational Methods in Economics focuses on the application of variational methods in economics, including autonomous system, dynamic programming, and phase spaces and diagrams. The manuscript first elaborates on growth models in economics and calculus of variations. Discussions focus on connection with dynamic programming, variable end points-free boundaries, transversality at infinity, sensitivity analysis-end point changes, Weierstrass and Legendre necessary conditions, and phase diagrams and phase spaces. The text then ponders on the constraints of classical theory, including unbounded intervals of integration, free boundary conditions, comparison functions, normality, and the problem of Bolza. The publication explains two-sector models of optimal economic growth, optimal control theory, and connections with the classical theory. Topics include capital good immobile between industries, constrained state variables, linear control problems, conversion of a control problem into a problem of Lagrange, and the conversion of a nonautonomous system into an autonomous system. The book is a valuable source of information for economists and researchers interested in the variational methods in economics. Nowadays applied work in business and economics requires a solid understanding of econometric methods to support decision-making. Combining a solid exposition of econometric methods with an application-oriented approach, this rigorous textbook provides students with a working understanding and hands-on experience of current econometrics. Taking a 'learning by doing' approach, it covers basic econometric methods (statistics, simple and multiple regression, nonlinear regression, maximum likelihood, and generalized method of moments), and addresses the creative process of model building with due attention to diagnostic testing and model improvement. Its last part is devoted to two major application areas: the econometrics of choice data (logit and probit, multinomial and ordered choice, truncated and censored data, and duration data) and the econometrics of time series data (univariate time series, trends, volatility, vector autoregressions, and a brief discussion of SUR models, panel data, and simultaneous equations). · Real-world text examples and practical exercise questions stimulate active learning and show how econometrics can solve practical questions in modern business and economic management. · Focuses on the core of econometrics, regression, and covers two major advanced topics, choice data with applications in marketing and micro-economics, and time series data with applications in finance and macro-economics. · Learning-support features include concise, manageable sections of text, frequent cross-references to related and background material, summaries, computational schemes, keyword lists, suggested further reading, exercise sets, and online data sets and solutions. · Derivations and theory exercises are clearly marked for students in advanced courses. This textbook is perfect for advanced undergraduate students, new graduate students, and applied researchers in econometrics, business, and economics, and for researchers in other fields that draw on modern applied econometrics. This textbook provides a hands-on and intuitive overview of the methodological foundations of experimental economics. Experimental economic research has been an integral part of economic science for quite some time and is gaining more and more attention in related disciplines. The book addresses the design and execution of experiments, the evaluation of experimental data and the equipment of an experimental laboratory. It illustrates the challenges involved in designing and conducting experiments and helps the reader to address them in practice. An accessible introduction to the analytical foundation of economics Theory and application of a variety of mathematical techniques in economics are presented in this volume. Topics discussed include: martingale methods, stochastic processes, optimal stopping, the modeling of uncertainty using a Wiener process, Itô's Lemma as a tool of stochastic calculus, and basic facts about stochastic differential equations. The notion of stochastic ability and the methods of stochastic control are discussed, and their use in economic theory and finance is illustrated with numerous applications. The applications covered include: futures, pricing, job search, stochastic capital theory, stochastic economic growth, the rational expectations hypothesis, a stochastic macroeconomic model, competitive firm under price uncertainty, the Black-Scholes option pricing theory, optimum consumption and portfolio rules, demand for index bonds, term structure of interest rates, the market risk adjustment in project valuation, demand for cash balances and an asset pricing model. To harness the full power of computer technology, economists need to use a broad range of mathematical techniques. In this book, Kenneth Judd presents techniques from the numerical analysis and applied mathematics literatures and shows how to use them in economic analyses. The book is divided into five parts. Part I provides a general introduction. Part II presents basics from numerical analysis on R^n, including linear equations, iterative methods, optimization, nonlinear equations, approximation methods, numerical integration and differentiation, and Monte Carlo methods. Part III covers methods for dynamic problems, including finite difference methods, projection methods, and numerical dynamic programming. Part IV covers perturbation and asymptotic solution methods. Finally, Part V covers applications to dynamic equilibrium analysis, including solution methods for perfect foresight models and rational expectation models. A website contains supplementary material including programs and answers to exercises.

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