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RQGPKV - LISA EDWARD

In How Economics Became a Mathematical Science E. Roy Weintraub traces the history of economics through the prism of the history of mathematics in the twentieth century. As mathematics has evolved, so has the image of mathematics, explains Weintraub, such as ideas about the standards for accepting proof, the meaning of rigor, and the nature of the mathematical enterprise itself. He also shows how economics itself has been shaped by economists' changing images of mathematics. Whereas others have viewed economics as autonomous, Weintraub presents a different picture, one in which changes in mathematics—both within the body of knowledge that constitutes mathematics and in how it is thought of as a discipline and as a type of knowledge—have been intertwined with the evolution of economic thought. Weintraub begins his account with Cambridge University, the intellectual birthplace of modern economics, and examines specifically Alfred Marshall and the Mathematical Tripos examinations—tests in mathematics that were required of all who wished to study economics at Cambridge. He proceeds to interrogate the idea of a rigorous mathematical economics through the connections between particular mathematical economists and mathematicians in each of the decades of the first half of the twentieth century, and thus describes how the mathematical issues of formalism and axiomatization have shaped economics. Finally, How Economics Became a Mathematical Science reconstructs the career of the economist Sidney Weintraub, whose relationship to mathematics is viewed through his relationships with his mathematician brother, Hal, and his mathematician-economist son, the book's author.

Mathematical economics and game theory approached with the fundamental mathematical toolbox of nonlinear functional analysis are the central themes of this text. Both optimization and equilibrium theories are covered in full detail. The book's central application is the fundamental economic problem of allocating scarce resources among competing agents, which leads to considerations of the interrelated applications in game theory and the theory of optimization. Mathematicians, mathematical economists, and operations research specialists will find that it provides a solid foundation in nonlinear functional analysis. This text begins by developing linear and convex analysis in the context of optimization theory. The treatment includes results on the existence and stability of solutions to optimization problems as well as an introduction to duality theory. The second part explores a number of topics in game theory and mathematical economics, including two-person games, which provide the framework to study theorems of nonlinear analysis. The text concludes with an introduction to non-linear analysis and optimal control theory, including an array of fixed point and subjectivity theorems that offer powerful tools in proving existence theorems.

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

This book provides a comprehensive introduction to the mathe-

matical foundations of economics, from basic set theory to fixed point theorems and constrained optimization. Rather than simply offer a collection of problem-solving techniques, the book emphasizes the unifying mathematical principles that underlie economics. Features include an extended presentation of separation theorems and their applications, an account of constraint qualification in constrained optimization, and an introduction to monotone comparative statics. These topics are developed by way of more than 800 exercises. The book is designed to be used as a graduate text, a resource for self-study, and a reference for the professional economist.

Updated to textbook form by popular demand, this second edition discusses diverse mathematical models used in economics, ecology, and the environmental sciences with emphasis on control and optimization. It is intended for graduate and upper-undergraduate course use, however, applied mathematicians, industry practitioners, and a vast number of interdisciplinary academics will find the presentation highly useful. Core topics of this text are: · Economic growth and technological development · Population dynamics and human impact on the environment · Resource extraction and scarcity · Air and water contamination · Rational management of the economy and environment · Climate change and global dynamics The step-by-step approach taken is problem-based and easy to follow. The authors aptly demonstrate that the same models may be used to describe different economic and environmental processes and that similar investigation techniques are applicable to analyze various models. Instructors will appreciate the substantial flexibility that this text allows while designing their own syllabus. Chapters are essentially self-contained and may be covered in full, in part, and in any order. Appropriate one- and two-semester courses include, but are not limited to, Applied Mathematical Modeling, Mathematical Methods in Economics and Environment, Models of Biological Systems, Applied Optimization Models, and Environmental Models. Prerequisites for the courses are Calculus and, preferably, Differential Equations.

This book is devoted to the mathematical analysis of models of economic dynamics and equilibria. These models form an important part of mathemati cal economics. Models of economic dynamics describe the motion of an economy through time. The basic concept in the study of these models is that of a trajectory, i.e., a sequence of elements of the phase space that describe admissible (possible) development of the economy. From all trajectories, we select those that are" desirable," i.e., optimal in terms of a certain criterion. The apparatus of point-set maps is the appropriate tool for the analysis of these models. The topological aspects of these maps (particularly, the Kakutani fixed-point theorem) are used to study equilibrium models as well as n-person games. To study dynamic models we use a special class of maps which, in this book, are called superlinear maps. The theory of superlinear point-set maps is, obviously, of interest in its own right. This theory is described in the first chapter. Chapters 2-4 are devoted to models of economic dynamics and present a detailed study of the properties of optimal trajectories. These properties are described in terms of theorems on characteristics (on the existence of dual prices) and turnpike theorems (theorems on asymptotic trajectories). In Chapter 5, we state and study a model of economic equilibrium. The basic idea is to establish a theorem about the existence of an equilibrium state for the Arrow-Debreu model and a certain generalization of it.

The question of how far mathematical methods of reasoning and inves tigation are applicable in economic theorising has long been a matter of debate. The first part of this question needing to be answered was whether, outside the range of ordinary statistical methods, such application is in fact possible. In my opinion the controversy on this point has been a fruitful one, which has led, as might have been expected, to an affirmative answer. What, however, has not yet been decided - for the simple reason that hitherto it has not been investigated - is whether the application of mathematical methods to our science is expedient. From the point of view of economic methodology this seems to me the more important part of the question, although the only considerations hitherto brought to bear upon it have been of a rather general character, based on uncer tain ideas which have led to uncertain conclusions. That is why I welcome this attempt of Dr. Heinz W. Brand to bring the solution nearer by his present work. The conclusion he reaches here is that mathematical methods cannot unreservedly be employed in our science. The arguments which he carefully weighs, in the course of a criticism which is never destructive, are centred on his own criterion of asking whether it is not merely possible, but at the same time profitable, to apply mathematics in economic science.

Recoge este libro publicado en honor de Wolfgang Eichhorn una serie de ensayos sobre economía matemática: operaciones de investigación y modelos de la empresa; riesgo, seguro y estadística; politica y metodología; teoría de la distribución etc. etc.

This book continues the ICTMA tradition of influencing teaching and learning in the application of mathematical modelling. Each chapter shows how real life problems can be discussed during university lectures, in school classrooms and industrial research. International experts contribute their knowledge and experience by providing analysis, insight and comment whilst tackling large and complex problems by applying mathematical modelling. This book covers the proceedings from the Twelfth International Conference on the Teaching of Mathematical Modelling and Applications. Covers the proceedings from the Twelfth International Conference on the Teaching of Mathematical Modelling and Applications Continues the ICTMA tradition of influencing teaching and learning in the application of mathematical modelling Shows how real life problems can be discussed during university lectures, in school classrooms and industrial research

This systematic exposition and survey of mathematical economics emphasizes the unifying structures of economic theory.

This volume presents a collection of more than sixty papers on mathematical economics. All papers use a model-based approach. The focus of the book is to demonstrate the state-of-the-art in modelling and research in important areas of economic theory. It is divided into four parts: Part I: Economics; Part II: Operations Research and Models of the Firm; Part III: Risk, Insurance, and Statistics; Part IV: Policy and Methodology. The papers are written by international experts who have dedicated their contributions to Wolfgang Eichhorn on the occasion of his 60th birthday. Researchers as well as graduate students interested in mathematical modelling in economics will find this book a rich source of interesting and novel results.

The problems of interrelation between human economics and natural environment include scientific, technical, economic, demographic, social, political and other aspects that are studied by scientists of many specialities. One of the important aspects in scientific study of environmental and ecological problems is the development of mathematical and computer tools for rational management of economics and environment. This book introduces a wide range of mathematical models in economics, ecology and environmental sciences to a general mathematical audience with no in-

-depth experience in this specific area. Areas covered are: controlled economic growth and technological development, world dynamics, environmental impact, resource extraction, air and water pollution propagation, ecological population dynamics and exploitation. A variety of known models are considered, from classical ones (Cobb Douglass production function, Leontief input-output analysis, Solow models of economic dynamics, Verhulst-Pearl and Lotka-Volterra models of population dynamics, and others) to the models of world dynamics and the models of water contamination propagation used after Chemobyl nuclear catastrophe. Special attention is given to modelling of hierarchical regional economic-ecological interaction and technological change in the context of environmental impact. XIII XIV Construction of Mathematical Models ...

A classic account of mathematical programming and control techniques and their applications to static and dynamic problems in economics.

This book contains a concise description of important mathematical methods of dynamics and suitable economic models. It covers discrete as well as continuous-time systems, linear and nonlinear models. Mixing traditional and modern materials, the study covers dynamics with and without optimization, naive and rational expectations, respectively. In addition to standard models of growth and cycles, the book also contains original studies on control of a multisector economy and expectations-driven multicohort economy. Numerous examples, problems (with solutions) and figures complete the book.

This text offers a presentation of the mathematics required to tackle problems in economic analysis. After a review of the fundamentals of sets, numbers, and functions, it covers limits and continuity, the calculus of functions of one variable, linear algebra, multivariate calculus, and dynamics.

Mathematical Models in Economics is a component of Encyclopedia of Mathematical Sciences in which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. This theme is organized into several different topics and introduces the applications of mathematics to economics. Mathematical economics has experienced rapid growth, generating many new academic fields associated with the development of mathematical theory and computer. Mathematics is the backbone of modern economics. It plays a basic role in creating ideas, constructing new theories, and empirically testing ideas and theories. Mathematics is now an integral part of economics. The main advances in modern economics are characterized by applying mathematics to various economic problems. Many of today's profound insights into economic problems could hardly be obtained without the help of mathematics. The concepts of equilibrium versus non-equilibrium, stability versus instability, and steady states versus chaos in the contemporary literature are difficult to explain without mathematics. The theme discusses on modern versions of some classical economic theories, taking account of balancing between significance of economic issues and mathematical techniques. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Providing an introduction to mathematical analysis as it applies to economic theory and econometrics, this book bridges the gap that has separated the teaching of basic mathematics for economics and the increasingly advanced mathematics demanded in economics research today. Dean Corbae, Maxwell B. Stinchcombe, and Juraj Zeman equip students with the knowledge of real and functional analysis and measure theory they need to read and do research in economic and econometric theory. Unlike other mathematics textbooks for economics, An Introduction to Mathematical Analysis for Economic Theory and Econometrics takes a unified approach to understanding basic and advanced spaces through the application of the Metric Completion Theorem. This is the concept by which, for example, the real numbers complete the rational numbers and measure spaces complete fields of measurable sets. Another of the book's unique features is its concentration on the mathematical foundations of econometrics. To illustrate difficult concepts, the authors use simple examples drawn from economic theory and econometrics. Accessible and rigorous, the book is self-contained, providing proofs of theorems and assuming only an undergraduate background in calculus and linear algebra. Begins with mathematical analysis and economic examples accessible to advanced undergraduates in order to build intuition for more complex analysis used by graduate students and researchers Takes a unified approach to understanding basic and advanced spaces of numbers through application of the Metric Completion Theorem Focuses on examples from econometrics to explain topics in measure theory

This textbook provides a one-semester introduction to mathematical economics for first year graduate and senior undergraduate students. Intended to fill the gap between typical liberal arts curriculum and the rigorous mathematical modeling of graduate study in economics, this text provides a concise introduction to the mathematics needed for core microeconomics, macroeconomics, and econometrics courses. Chapters 1 through 5 builds students’ skills in formal proof, axiomatic treatment of linear algebra, and elementary vector differentiation. Chapters 6 and 7 present the basic tools needed for microeconomic analysis. Chapter 8 provides a quick introduction to (or review of) probability theory. Chapter 9 introduces dynamic modeling, applicable in advanced macroeconomics courses. The materials assume prerequisites in undergraduate calculus and linear algebra. Each chapter includes in-text exercises and a solutions manual, making this text ideal for self-study.

The main goal of this book is to present coherent mathematical models to describe an economic growth and related economic issues. The book is a continuation of the authors previous book Mathematical Dynamics of Economic Markets (9781594545283), which presented mathematical models of economic forces acting on the markets. In his previous book, the author described a system of ordinary differential equations, which connected together economic forces behind the products demand, supply and prices on the market. The author focuses on a specific aspect of how to modify the said system of ordinary differential equations, in order to describe the phenomenon of economic growth. In order to achieve clarity, the author restricted himself to economic processes arising on the markets of a single-product economy. Economic growth is presented as a result of savings and investment occurring on the markets. The markets participants withdraw part of the product from markets in the form of savings and use the withdrawn product in production in the form of an investment. The withdrawal drives the products supply on the market down while at the same time driving the products price up, which in turn drives the products demand down. When an impact of the products price increase exceeds an impact of the products demand decrease, economic growth occurs. Contrarily, one observes an eco-

nomic decline in the opposite situation. The author looks into various aspects that savings and investment exert on the market. He in particular discusses the models that examine an economic growth in situations when savings and investment were done in the form of a one-time withdrawal of the product, constant-rate withdrawal of product, constant-accelerated withdrawal of product, and exponential withdrawal of product from the market. The author further examines an impact of four economic concepts on economic growth -- demand, supply, investment, and debt. He presents mathematical models exploring interconnections among these concepts and studies their mutual impacts on both economic growth and decline. He builds a mathematical model in order to verify a hypothesis that weak recovery after the financial crisis could be attributed to the decline of investments that were not compensated by the decrease of an interest rate. The author also looks into the phenomenon of economic crises and builds a few mathematical models. The models of four economic crises are considered. The first model concerns the last financial crisis where an author tried to explain how relatively small disturbances on financial markets had produced a large impact on the real economy. His conclusion is that fluctuations on connected markets amplify each other, which is known as the resonance phenomenon. The second model relates to the monetary part of Japanese economic policy known as Abenomics, where the price of Japanese bonds decreases and the yield increases. The author builds a mathematical model to investigate this phenomenon. The third model is about a secular stagnation hypothesis advanced by Lawrence Summers. The author complements his model of economic growth with the external supply of product to the market. He found that external supply provided with either constant rate or constant acceleration can cause a restricted or unrestricted economic decline, respectively. The fourth model is a model describing the four stages of the Greek economic crisis (before the Eurozone, before the Euro crisis, after the Euro crisis, and during the austerity period) and two potential recovery stages (with austere and benign economic transformations).

Mathematical Modelling sets out the general principles of mathematical modelling as a means comprehending the world. Within the book, the problems of physics, engineering, chemistry, biology, medicine, economics, ecology, sociology, psychology, political science, etc. are all considered through this uniform lens. The author describes different classes of models, including lumped and distributed parameter systems, deterministic and stochastic models, continuous and discrete models, static and dynamical systems, and more. From a mathematical point of view, the considered models can be understood as equations and systems of equations of different nature and variational principles. In addition to this, mathematical features of mathematical models, applied control and optimization problems based on mathematical models, and identification of mathematical models are also presented. Features Each chapter includes four levels: a lecture (main chapter material), an appendix (additional information), notes (explanations, technical calculations, literature review) and tasks for independent work; this is suitable for undergraduates and graduate students and does not require the reader to take any prerequisite course, but may be useful for researchers as well Described mathematical models are grouped both by areas of application and by the types of obtained mathematical problems, which contributes to both the breadth of coverage of the material and the depth of its understanding Can be used as the main textbook on a mathematical modelling course, and is also recommended for special courses on mathematical models for physics, chemistry, biology, economics, etc.

This book presents a unified treatment of optimization theory, game theory and a general equilibrium theory in economics in the framework of nonlinear functional analysis. It not only provides powerful and versatile tools for solving specific problems in economics and the social sciences but also serves as a unifying theme in the mathematical theory of these subjects as well as in pure mathematics itself.

Graduate-level text provides complete and rigorous expositions of economic models analyzed primarily from the point of view of their mathematical properties, followed by relevant mathematical reviews. Part I covers optimizing theory; Parts II and III survey static and dynamic economic models; and Part IV contains the mathematical reviews, which range fromn linear algebra to point-to-set mappings.

This single-volume edition of a 2-volume set, discusses the theory of matrix games, linear and nonlinear programming, and mathematical economics while clarifying key mathematical concepts and demonstrates their applicability. 1959 edition.

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

Elements of Numerical Mathematical Economics with Excel: Static and Dynamic Optimization shows readers how to apply static and dynamic optimization theory in an easy and practical manner, without requiring the mastery of specific programming languages that are often difficult and expensive to learn. Featuring user-friendly numerical discrete calculations developed within the Excel worksheets, the book includes key examples and economic applications solved step-by-step and then replicated in Excel. After introducing the fundamental tools of mathematical economics, the book explores the classical static optimization theory of linear and nonlinear programming, applying the core concepts of microeconomics and some portfolio theory. This provides a background for the more challenging worksheet applications of the dynamic optimization theory. The book also covers special complementary topics such as inventory modelling, data analysis for business and economics, and the essential elements of Monte Carlo analysis. Practical and accessible, Elements of Numerical Mathematical Economics with Excel: Static and Dynamic Optimization increases the computing power of economists worldwide. This book is accompanied by a companion website that includes Excel examples presented in the book, exercises, and other supplementary materials that will further assist in understanding this useful framework. Explains how Excel provides a practical numerical approach to optimization theory and analytics Increases access to the economic applications of this universally-available, relatively simple software program Encourages readers to go to the core of theoretical continuous calculations and learn more about optimization processes

Mathematical Modeling in Economics and Finance is designed as a textbook for an upper-division course on modeling in the economic sciences. The emphasis throughout is on the modeling process including post-modeling analysis and criticism. It is a textbook on

modeling that happens to focus on financial instruments for the management of economic risk. The book combines a study of mathematical modeling with exposure to the tools of probability theory, difference and differential equations, numerical simulation, data analysis, and mathematical analysis. Students taking a course from Mathematical Modeling in Economics and Finance will come to understand some basic stochastic processes and the solutions to stochastic differential equations. They will understand how to use those tools to model the management of financial risk. They will gain a deep appreciation for the modeling process and learn methods of testing and evaluation driven by data. The reader of this book will be successfully positioned for an entry-level position in the financial services industry or for beginning graduate study in finance, economics, or actuarial science. The exposition in Mathematical Modeling in Economics and Finance is crystal clear and very student-friendly. The many exercises are extremely well designed. Steven Dunbar is Professor Emeritus of Mathematics at the University of Nebraska and he has won both university-wide and MAA prizes for extraordinary teaching. Dunbar served as Director of the MAA's American Mathematics Competitions from 2004 until 2015. His ability to communicate mathematics is on full display in this approachable, innovative text.

Using examples from finance and modern warfare to the flocking of birds and the swarming of bacteria, the collected research in this volume demonstrates the common methodological approaches and tools for modeling and simulating collective behavior. The topics presented point toward new and challenging frontiers of applied mathematics, making the volume a useful reference text for applied mathematicians, physicists, biologists, and economists involved in the modeling of socio-economic systems.

In this new book the author, Alexi Krouglov, examines real business cycles, financial markets, and economic growth with various mathematical models. Real business cycles are examined with three different models: one product and one supplier, one product and two suppliers, and n-products with n-suppliers. Financial markets are examined with more complex models because more complex topics, such as inflation and the stock market, are involved. Economic growth is examined through mathematical models that are specifically concerned with trade and arbitrage.

The ability to conceptualize an economic problem verbally, to formulate it as a mathematical model, and then represent the mathematics in software so that the model can be solved on a computer is a crucial skill for economists. Computational Economics contains well-known models--and some brand-new ones--designed to help students move from verbal to mathematical to computational representations in economic modeling. The authors' focus, however, is not just on solving the models, but also on developing the ability to modify them to reflect one's interest and point of view. The result is a book that enables students to be creative in developing models that are relevant to the economic problems of their times. Unlike other computational economics textbooks, this book is organized around economic topics, among them macroeconomics, microeconomics, and finance. The authors employ various software systems--including MATLAB, Mathematica, GAMS, the nonlinear programming solver in Excel, and the database systems in Access--to enable students to use the most advantageous system. The book progresses from relatively simple models to more complex ones, and includes appendices on the ins and outs of running each program. The book is intended for use by advanced undergraduates and professional economists and even, as a first exposure to computational economics, by graduate students. Organized by economic topics Progresses from simple to more complex models Includes instructions on numerous software systems Encourages customization and creativity

A textbook for a first-year PhD course in mathematics for economists and a reference for graduate students in economics.