

Dynamic Programming In Economics

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Dynamic Optimization, Second Edition - Morton I. Kamien 2013-04-17
Since its initial publication, this text has defined courses in dynamic optimization taught to economics and management science students. The two-part treatment covers the calculus of variations and optimal control. 1998 edition.

Dynamic Optimization - Karl Hinderer 2017-01-12
This book explores discrete-time dynamic optimization and provides a detailed introduction to both deterministic and stochastic models. Covering problems with finite and infinite horizon, as well as Markov renewal programs, Bayesian control models and partially observable processes, the book focuses on the precise modelling of applications in a variety of areas, including operations research, computer science, mathematics, statistics, engineering, economics and finance. Dynamic Optimization is a carefully presented textbook which starts with discrete-time deterministic dynamic optimization problems, providing readers with the tools for sequential decision-making, before proceeding to the more complicated stochastic models. The authors present complete and simple proofs and illustrate the main results with numerous examples

and exercises (without solutions). With relevant material covered in four appendices, this book is completely self-contained.

Mathematical Economics - Kelvin Lancaster 2012-10-10
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 from linear algebra to point-to-set mappings.

Variational Methods in Economics - G. Hadley 2014-07-22
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.

Elements of Dynamic Optimization - Alpha C. Chiang 1999-12-22

In this text, Dr. Chiang introduces students to the most important methods of dynamic optimization used in economics. The classical calculus of variations, optimal control theory, and dynamic programming in its discrete form are explained in the usual Chiang fashion, with patience and thoroughness. The economic examples, selected from both classical and recent literature, serve not only to illustrate applications of the mathematical methods, but also to provide a useful glimpse of the development of thinking in several areas of economics.

Reinforcement Learning and Dynamic Programming Using Function Approximators - Lucian Busoniu 2017-07-28

From household appliances to applications in robotics, engineered systems involving complex dynamics can only be as effective as the algorithms that control them. While Dynamic Programming (DP) has provided researchers with a way to optimally solve decision and control problems involving complex dynamic systems, its practical value was limited by algorithms that lacked the capacity to scale up to realistic problems. However, in recent years, dramatic developments in Reinforcement Learning (RL), the model-free counterpart of DP, changed our understanding of what is possible. Those developments led to the creation of reliable methods that can be applied even when a mathematical model of the system is unavailable, allowing researchers to solve challenging control problems in engineering, as well as in a variety

of other disciplines, including economics, medicine, and artificial intelligence. Reinforcement Learning and Dynamic Programming Using Function Approximators provides a comprehensive and unparalleled exploration of the field of RL and DP. With a focus on continuous-variable problems, this seminal text details essential developments that have substantially altered the field over the past decade. In its pages, pioneering experts provide a concise introduction to classical RL and DP, followed by an extensive presentation of the state-of-the-art and novel methods in RL and DP with approximation. Combining algorithm development with theoretical guarantees, they elaborate on their work with illustrative examples and insightful comparisons. Three individual chapters are dedicated to representative algorithms from each of the major classes of techniques: value iteration, policy iteration, and policy search. The features and performance of these algorithms are highlighted in extensive experimental studies on a range of control applications. The recent development of applications involving complex systems has led to a surge of interest in RL and DP methods and the subsequent need for a quality resource on the subject. For graduate students and others new to the field, this book offers a thorough introduction to both the basics and emerging methods. And for those researchers and practitioners working in the fields of optimal and adaptive control, machine learning, artificial intelligence, and operations research, this resource offers a combination of practical algorithms, theoretical analysis, and comprehensive examples that they will be able to adapt and apply to their own work. Access the authors' website at www.dsc.tudelft.nl/rlbook/ for additional material, including computer code used in the studies and information concerning new developments.

Computational Methods for the Study of Dynamic Economies - Ramon Marimon 1999-03-04

Macroeconomics increasingly uses stochastic dynamic general equilibrium models to understand theoretical and policy issues. Unless very strong assumptions are made, understanding the properties of particular models requires solving the model using a computer. This volume brings together leading contributors in the field who explain in

detail how to implement the computational techniques needed to solve dynamic economics models. A broad spread of techniques are covered, and their application in a wide range of subjects discussed. The book provides the basics of a toolkit which researchers and graduate students can use to solve and analyse their own theoretical models.

Recursive Macroeconomic Theory, fourth edition - Lars Ljungqvist
2018-09-11

The substantially revised fourth edition of a widely used text, offering both an introduction to recursive methods and advanced material, mixing tools and sample applications. Recursive methods provide powerful ways to pose and solve problems in dynamic macroeconomics. Recursive Macroeconomic Theory offers both an introduction to recursive methods and more advanced material. Only practice in solving diverse problems fully conveys the advantages of the recursive approach, so the book provides many applications. This fourth edition features two new chapters and substantial revisions to other chapters that demonstrate the power of recursive methods. One new chapter applies the recursive approach to Ramsey taxation and sharply characterizes the time inconsistency of optimal policies. These insights are used in other chapters to simplify recursive formulations of Ramsey plans and credible government policies. The second new chapter explores the mechanics of matching models and identifies a common channel through which productivity shocks are magnified across a variety of matching models. Other chapters have been extended and refined. For example, there is new material on heterogeneous beliefs in both complete and incomplete markets models; and there is a deeper account of forces that shape aggregate labor supply elasticities in lifecycle models. The book is suitable for first- and second-year graduate courses in macroeconomics. Most chapters conclude with exercises; many exercises and examples use Matlab or Python computer programming languages.

Dynamic Economics - Jerome Adda 2003-08-29

An integrated approach to the empirical application of dynamic optimization programming models, for students and researchers. This book is an effective, concise text for students and researchers that

combines the tools of dynamic programming with numerical techniques and simulation-based econometric methods. Doing so, it bridges the traditional gap between theoretical and empirical research and offers an integrated framework for studying applied problems in macroeconomics and microeconomics. In part I the authors first review the formal theory of dynamic optimization; they then present the numerical tools and econometric techniques necessary to evaluate the theoretical models. In language accessible to a reader with a limited background in econometrics, they explain most of the methods used in applied dynamic research today, from the estimation of probability in a coin flip to a complicated nonlinear stochastic structural model. These econometric techniques provide the final link between the dynamic programming problem and data. Part II is devoted to the application of dynamic programming to specific areas of applied economics, including the study of business cycles, consumption, and investment behavior. In each instance the authors present the specific optimization problem as a dynamic programming problem, characterize the optimal policy functions, estimate the parameters, and use models for policy evaluation. The original contribution of *Dynamic Economics: Quantitative Methods and Applications* lies in the integrated approach to the empirical application of dynamic optimization programming models. This integration shows that empirical applications actually complement the underlying theory of optimization, while dynamic programming problems provide needed structure for estimation and policy evaluation.

Dynamic Programming - Eric V. Denardo 2012-12-27

Introduction to sequential decision processes covers use of dynamic programming in studying models of resource allocation, methods for approximating solutions of control problems in continuous time, production control, more. 1982 edition.

Dynamic Programming of Economic Decisions - Martin F. Bach
2013-11-11

Dynamic Programming is the analysis of multistage decision in the sequential mode. It is now widely recognized as a tool of great versatility and power, and is applied to an increasing extent in all phases of

economic analysis, operations research, technology, and also in mathematical theory itself. In economics and operations research its impact may someday rival that of linear programming. The importance of this field is made apparent through a growing number of publications. Foremost among these is the pioneering work of Bellman. It was he who originated the basic ideas, formulated the principle of optimality, recognized its power, coined the terminology, and developed many of the present applications. Since then mathematicians, statisticians, operations researchers, and economists have come in, laying more rigorous foundations [KARLIN, BLACKWELL], and developing in depth such application as to the control of stochastic processes [HoWARD, JEWELL]. The field of inventory control has almost split off as an independent branch of Dynamic Programming on which a great deal of effort has been expended [ARRoW, KARLIN, SCARF], [WIDTIN], [WAGNER]. Dynamic Programming is also playing an increasing role in modern mathematical control theory [BELLMAN, Adaptive Control Processes (1961)]. Some of the most exciting work is going on in adaptive programming which is closely related to sequential statistical analysis, particularly in its Bayesian form. In this monograph the reader is introduced to the basic ideas of Dynamic Programming.

Elements of Numerical Mathematical Economics with Excel - Giovanni Romeo 2019-11-28

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.

Dynamic Economic Analysis - Milton Harris 1987

In industrial organization and labour economics, many of the most interesting recent contributions have encompassed explicit dynamics as well as extensive form games. This book collects and explains a number of the most widely used techniques in dynamic economic analysis.

Economic Dynamics, second edition - John Stachurski 2022-08-16

The second edition of a rigorous and example-driven introduction to topics in economic dynamics that emphasizes techniques for modeling dynamic systems. This text provides an introduction to the modern theory of economic dynamics, with emphasis on mathematical and computational techniques for modeling dynamic systems. Written to be both rigorous and engaging, the book shows how sound understanding of the underlying theory leads to effective algorithms for solving real-world problems. The material makes extensive use of programming examples to illustrate ideas, bringing to life the abstract concepts in the text. Key topics include algorithms and scientific computing, simulation, Markov models, and dynamic programming. Part I introduces fundamentals and part II covers more advanced material. This second edition has been thoroughly updated, drawing on recent research in the field. New for the second edition: "Programming-language agnostic" presentation using

pseudocode. New chapter 1 covering conceptual issues concerning Markov chains such as ergodicity and stability. New focus in chapter 2 on algorithms and techniques for program design and high-performance computing. New focus on household problems rather than optimal growth in material on dynamic programming. Solutions to many exercises, code, and other resources available on a supplementary website.

Mathematical Methods in Dynamic Economics - A. Simonovits
2000-06-05

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.

Recursive Methods in Economic Dynamics - Nancy L. Stokey 1989-10-10
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.

Dynamic Economics - Gregory C. Chow 1997

This work presents the optimization framework for dynamic economics and treats a number of topics in economics, including growth, macroeconomics, microeconomics, finance and dynamic games. The book also teaches by examples, using concepts to solve simple problems, moving on to general propositions.

Advanced Mathematical Methods in Environmental and Resource Economics - Anastasios Xepapadeas

Advanced Mathematics for Economists - Peter J. Lambert 1985-01-01

Discrete Time Dynamic Economic Models - Brian Ferguson
2003-07-10

This new book will be welcomed by econometricians and students of econometrics everywhere. Introducing discrete time modelling techniques and bridging the gap between economics and econometric literature, this ambitious book is sure to be an invaluable resource for all those to whom the terms unit roots, cointegration and error correction forms, chaos theory and random walks are recognisable if not yet fully understood.

Dynamic Economics - Gregory C. Chow 1997-02-13

This work provides a unified and simple treatment of dynamic economics using dynamic optimization as the main theme, and the method of Lagrange multipliers to solve dynamic economic problems. The author presents the optimization framework for dynamic economics in order that readers can understand the approach and use it as they see fit. Instead of using dynamic programming, the author chooses instead to use the method of Lagrange multipliers in the analysis of dynamic optimization because it is easier and more efficient than dynamic programming, and allows readers to understand the substance of dynamic economics better. The author treats a number of topics in economics, including economic growth, macroeconomics, microeconomics, finance and dynamic games. The book also teaches by examples, using concepts to solve simple problems; it then moves to general propositions.

Dynamic Programming Solutions for Economic Models Requiring Little Information about the Future - Hans Ulrich Buhl 1983

Optimization in Economics and Finance - Bruce D. Craven 2006-03-30
Some recent developments in the mathematics of optimization, including the concepts of invexity and quasimax, have not yet been applied to models of economic growth, and to finance and investment. Their applications to these areas are shown in this book.

Recursive Methods in Economic Dynamics - Nancy L. Stokey 1989-10-10
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.

Dynamic Programming in Economics - Cuong Van 2003-04-30

Dynamic Programming in Economics is an outgrowth of a course intended for students in the first year PhD program and for researchers in Macroeconomics Dynamics. It can be used by students and researchers in Mathematics as well as in Economics. The purpose of Dynamic Programming in Economics is twofold: (a) to provide a rigorous, but not too complicated, treatment of optimal growth models in infinite discrete time horizon, (b) to train the reader to the use of optimal growth models and hence to help him to go further in his research. We are convinced that there is a place for a book which stays somewhere between the "minimum tool kit" and specialized monographs leading to the frontiers of research on optimal growth.

Optimisation in Economic Analysis - Gordon Mills 2003

One of the fundamental economic problems is one of making the best use of limited resources. As a result, mathematical optimisation methods play a crucial role in economic theory. Covering the use of such methods in applied and policy contexts, this book deals not only with the main techniques (linear programming, nonlinear optimisation and dynamic programming), but also emphasizes the art of model-building and discusses fields such as optimisation over time.

Exercises in Dynamic Macroeconomic Theory - Rodolfo E. Manuelli 2009-06-01

This book is a companion volume to Dynamic Macroeconomic Theory by Thomas J. Sargent. It provides scrimmages in dynamic macroeconomic theory--precisely the kind of drills that people will need in order to learn the techniques of dynamic programming and its applications to economics. By doing these exercises, the reader can acquire the ability to put the theory to work in a variety of new situations, build technical skill, gain experience in fruitful ways of setting up problems, and learn to distinguish cases in which problems are well posed from cases in which they are not. The basic framework provided by variants of a dynamic

general equilibrium model is used to analyze problems in macroeconomics and monetary economics. An equilibrium model provides a mapping from parameters of preferences, technologies, endowments, and "rules of the game" to a probability model for time series. The rigor of the logical connections between theory and observations that the mapping provides is an attractive feature of dynamic equilibrium, or "rational expectations," models. This book gives repeated and varied practice in constructing and interpreting this mapping.

Optimization in Economic Theory - Avinash K. Dixit 1990

A new edition of a student text which provides a broad study of optimization methods. It builds on the base of simple economic theory, elementary linear algebra and calculus, and reinforces each new mathematical idea by relating it to its economic application.

Nonlinear and Dynamic Programming - S. Dano 2012-12-06

This book is intended to provide an introductory text of Nonlinear and Dynamic Programming for students of managerial economics and operations research. The author also hopes that engineers, business executives, managers, and others responsible for planning of industrial operations may find it useful as a guide to the problems and methods treated, with a view to practical applications. The book may be considered as a sequel to the author's Linear Programming in Industry (1960, 4th revised and enlarged edition 1974), but it can be used independently by readers familiar with the elements of linear programming models and techniques. The two volumes constitute an introduction to the methods of mathematical programming and their application to industrial optimization problems. The author feels that the vast and ever-increasing literature on mathematical programming has not rendered an introductory exposition superfluous. The general student often tends to feel somewhat lost if he goes straight to the special literature; he will be better equipped for tackling real problems and using computer systems if he has acquired some previous training in constructing small-scale programming models and applying standard algorithms for solving them by hand. The book is intended to provide this

kind of training, keeping the mathematics at the necessary minimum. The text contains numerous exercises. The reader should work out these problems for himself and check with the answers given at the end of the book. The text is based on lectures given at the University of Copenhagen.

Stochastic Optimization Models in Finance - W. T. Ziemba

2014-05-12

Stochastic Optimization Models in Finance focuses on the applications of stochastic optimization models in finance, with emphasis on results and methods that can and have been utilized in the analysis of real financial problems. The discussions are organized around five themes: mathematical tools; qualitative economic results; static portfolio selection models; dynamic models that are reducible to static models; and dynamic models. This volume consists of five parts and begins with an overview of expected utility theory, followed by an analysis of convexity and the Kuhn-Tucker conditions. The reader is then introduced to dynamic programming; stochastic dominance; and measures of risk aversion. Subsequent chapters deal with separation theorems; existence and diversification of optimal portfolio policies; effects of taxes on risk taking; and two-period consumption models and portfolio revision. The book also describes models of optimal capital accumulation and portfolio selection. This monograph will be of value to mathematicians and economists as well as to those interested in economic theory and mathematical economics.

Optimal Control Theory and Static Optimization in Economics - Daniel

Léonard 1992-01-31

Optimal control theory is a technique being used increasingly by academic economists to study problems involving optimal decisions in a multi-period framework. This textbook is designed to make the difficult subject of optimal control theory easily accessible to economists while at the same time maintaining rigour. Economic intuitions are emphasized, and examples and problem sets covering a wide range of applications in economics are provided to assist in the learning process. Theorems are clearly stated and their proofs are carefully explained. The development

of the text is gradual and fully integrated, beginning with simple formulations and progressing to advanced topics such as control parameters, jumps in state variables, and bounded state space. For greater economy and elegance, optimal control theory is introduced directly, without recourse to the calculus of variations. The connection with the latter and with dynamic programming is explained in a separate chapter. A second purpose of the book is to draw the parallel between optimal control theory and static optimization. Chapter 1 provides an extensive treatment of constrained and unconstrained maximization, with emphasis on economic insight and applications. Starting from basic concepts, it derives and explains important results, including the envelope theorem and the method of comparative statics. This chapter may be used for a course in static optimization. The book is largely self-contained. No previous knowledge of differential equations is required.

Foundations of Dynamic Economic Analysis - Michael R. Caputo

2005-01-10

Foundations of Dynamic Economic Analysis presents a modern and thorough exposition of the fundamental mathematical formalism used to study optimal control theory, i.e., continuous time dynamic economic processes, and to interpret dynamic economic behavior. The style of presentation, with its continual emphasis on the economic interpretation of mathematics and models, distinguishes it from several other excellent texts on the subject. This approach is aided dramatically by introducing the dynamic envelope theorem and the method of comparative dynamics early in the exposition. Accordingly, motivated and economically revealing proofs of the transversality conditions come about by use of the dynamic envelope theorem. Furthermore, such sequencing of the material naturally leads to the development of the primal-dual method of comparative dynamics and dynamic duality theory, two modern approaches used to tease out the empirical content of optimal control models. The stylistic approach ultimately draws attention to the empirical richness of optimal control theory, a feature missing in virtually all other textbooks of this type.

Economic Dynamics - John Stachurski 2009-01-16

A rigorous and example-driven introduction to topics in economic dynamics, with an emphasis on mathematical and computational techniques for modeling dynamic systems. This text provides an introduction to the modern theory of economic dynamics, with emphasis on mathematical and computational techniques for modeling dynamic systems. Written to be both rigorous and engaging, the book shows how sound understanding of the underlying theory leads to effective algorithms for solving real world problems. The material makes extensive use of programming examples to illustrate ideas. These programs help bring to life the abstract concepts in the text. Background in computing and analysis is offered for readers without programming experience or upper-level mathematics. Topics covered in detail include nonlinear dynamic systems, finite-state Markov chains, stochastic dynamic programming, stochastic stability and computation of equilibria. The models are predominantly nonlinear, and the emphasis is on studying nonlinear systems in their original form, rather than by means of rudimentary approximation methods such as linearization. Much of the material is new to economics and improves on existing techniques. For graduate students and those already working in the field, *Economic Dynamics* will serve as an essential resource.

Economic Modeling and Inference - Bent Jesper Christensen
2021-07-13

Economic Modeling and Inference takes econometrics to a new level by demonstrating how to combine modern economic theory with the latest statistical inference methods to get the most out of economic data. This graduate-level textbook draws applications from both microeconomics and macroeconomics, paying special attention to financial and labor economics, with an emphasis throughout on what observations can tell us about stochastic dynamic models of rational optimizing behavior and equilibrium. Bent Jesper Christensen and Nicholas Kiefer show how parameters often thought estimable in applications are not identified even in simple dynamic programming models, and they investigate the roles of extensions, including measurement error, imperfect control, and random utility shocks for inference. When all implications of optimization

and equilibrium are imposed in the empirical procedures, the resulting estimation problems are often nonstandard, with the estimators exhibiting nonregular asymptotic behavior such as short-ranked covariance, superconsistency, and non-Gaussianity. Christensen and Kiefer explore these properties in detail, covering areas including job search models of the labor market, asset pricing, option pricing, marketing, and retirement planning. Ideal for researchers and practitioners as well as students, *Economic Modeling and Inference* uses real-world data to illustrate how to derive the best results using a combination of theory and cutting-edge econometric techniques. Covers identification and estimation of dynamic programming models Treats sources of error--measurement error, random utility, and imperfect control Features financial applications including asset pricing, option pricing, and optimal hedging Describes labor applications including job search, equilibrium search, and retirement Illustrates the wide applicability of the approach using micro, macro, and marketing examples

Numerical Methods in Economics - Kenneth L. Judd 1998-09-28
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.

Introduction to Methods of Optimization - Leon Cooper 1970

Stochastic Optimal Control in Infinite Dimension - Giorgio Fabbri
2017-06-22

Providing an introduction to stochastic optimal control in infinite dimension, this book gives a complete account of the theory of second-order HJB equations in infinite-dimensional Hilbert spaces, focusing on its applicability to associated stochastic optimal control problems. It features a general introduction to optimal stochastic control, including basic results (e.g. the dynamic programming principle) with proofs, and provides examples of applications. A complete and up-to-date exposition of the existing theory of viscosity solutions and regular solutions of second-order HJB equations in Hilbert spaces is given, together with an extensive survey of other methods, with a full bibliography. In particular, Chapter 6, written by M. Fuhrman and G. Tessitore, surveys the theory of regular solutions of HJB equations arising in infinite-dimensional stochastic control, via BSDEs. The book is of interest to both pure and applied researchers working in the control theory of stochastic PDEs, and in PDEs in infinite dimension. Readers from other fields who want to learn the basic theory will also find it useful. The prerequisites are: standard functional analysis, the theory of semigroups of operators and its use in the study of PDEs, some knowledge of the dynamic programming approach to stochastic optimal control problems in finite dimension, and the basics of stochastic analysis and stochastic equations in infinite-dimensional spaces.

Dynamic Macroeconomic Theory - Thomas J. Sargent 2009-06-01

The tasks of macroeconomics are to interpret observations on economic aggregates in terms of the motivations and constraints of economic agents and to predict the consequences of alternative hypothetical ways of administering government economic policy. General equilibrium models form a convenient context for analyzing such alternative government policies. In the past ten years, the strengths of general equilibrium models and the corresponding deficiencies of Keynesian and monetarist models of the 1960s have induced macroeconomists to begin

applying general equilibrium models. This book describes some general equilibrium models that are dynamic, that have been built to help interpret time-series of observations of economic aggregates and to predict the consequences of alternative government interventions. The first part of the book describes dynamic programming, search theory, and real dynamic capital pricing models. Among the applications are stochastic optimal growth models, matching models, arbitrage pricing theories, and theories of interest rates, stock prices, and options. The remaining parts of the book are devoted to issues in monetary theory; currency-in-utility-function models, cash-in-advance models, Townsend turnpike models, and overlapping generations models are all used to study a set of common issues. By putting these models to work on concrete problems in exercises offered throughout the text, Sargent provides insights into the strengths and weaknesses of these models of money. An appendix on functional analysis shows the unity that underlies the mathematics used in disparate areas of rational expectations economics. This book on dynamic equilibrium macroeconomics is suitable for graduate-level courses; a companion book, *Exercises in Dynamic Macroeconomic Theory*, provides answers to the exercises and is also available from Harvard University Press.

Dynamic Programming - John Kennedy 1986-08-29

The management of agricultural and natural resource systems; The methods of dynamic programming; Dynamic programming applications to agriculture; Dynamic programming applications to natural resources.

Applied Dynamic Programming - Richard E. Bellman 2015-12-08

This comprehensive study of dynamic programming applied to numerical solution of optimization problems. It will interest aerodynamic, control, and industrial engineers, numerical analysts, and computer specialists, applied mathematicians, economists, and operations and systems analysts. Originally published in 1962. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and

hardcover editions. The goal of the Princeton Legacy Library is to vastly

increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.