



Numerical Methods in Economics (MIT Press)

By Kenneth L. Judd

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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 \mathbb{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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Editorial Review

Review

Judd's book is a masterpiece which will help transform the way economic theory is done. It harnesses the computer revolution in the service of economic theory by collecting together a whole array of numerical methods to simulate and quantify models that used to be purely algebraic and qualitative.

(Avinash K. Dixit, Princeton University)

Deductive economic theory is dead! Long live computational economic theory. Ken Judd's book is a brilliant exposition of how we can do theory without theorems in economics.

(Jean Charles Rochet, Professor of Mathematics and Economics, Institut D'économie Industrielle, Toulouse, France)

This book is a masterwork written by a giant in the field. Here are very fast computational methods tailor-made by Judd for economics. These methods will enable researchers to dispense with artificial assumptions which have been made in the past in order to purchase analytical tractability. The power of the methods is illustrated by many examples. This book may have the same impact on the practice of economic theorizing as computational methods have had upon statistical inference.

(W. A. Brock, Department of Economics, University of Wisconsin)

Recent advances in computer power have permitted enormous progress in the numerical solution and analysis of complex economic model. *Numerical Methods in Economics* clearly presents a vast range of materials on this topic, from background mathematics through numerical algorithms to economic applications. Students will find this volume an accessible introduction to the field; experienced practitioners will find it a perennial reference.

(James M. Poterba, Mitsui Professor of Economics, MIT)

Kenneth Judd's book is a landmark that will establish him as one of the founding fathers of the nascent field of computational economics. The book is an impressive contribution not only for its breadth, but also for its mathematical depth and sophistication. But in the final analysis *Numerical Methods in Economics* is an eminently practical 'cookbook' filled with many clearly described recipes for solving a broad variety of models in fields ranging from economic theory, macroeconomics, to public economics. I would recommend that any serious economist have a copy of this book on their desk, regardless of whether their interest in theory or in applications. An understanding of effective numerical methods is quickly becoming an indispensable for doing any sort of high level work in economics.

(John Rust, Department of Economics, Yale University)

About the Author

Kenneth L. Judd is a Senior Fellow at the Hoover Institution.

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