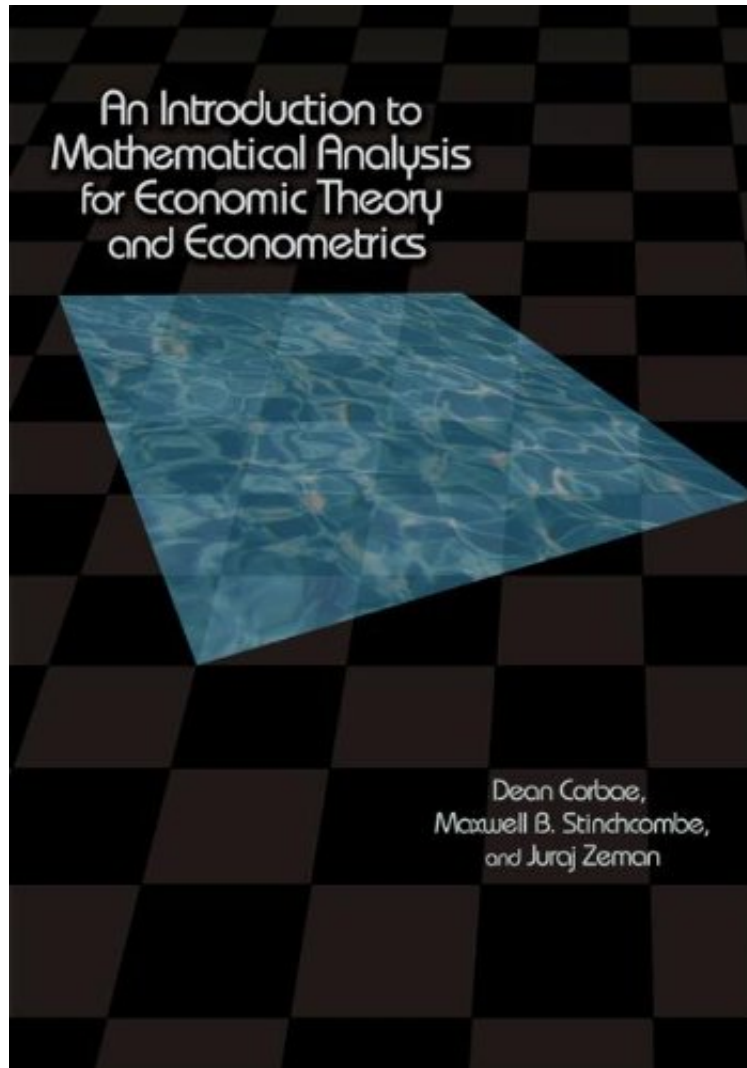


An Introduction to Mathematical Analysis for Economic Theory and Econometrics

Dean Corbae, Maxwell B. Stinchcombe, Juraj Zeman

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Dean Corbae, Maxwell B. Stinchcombe, Juraj Zeman : An Introduction to Mathematical Analysis for Economic Theory and Econometrics before purchasing it in order to gage whether or not it would be worth my time, and all praised An Introduction to Mathematical Analysis for Economic Theory and Econometrics:

0 of 0 people found the following review helpful. Five StarsBy Customernice book~49 of 51 people found the following review helpful. An impressive collection of tools from Mathematical Analysis applied to different fields of economicsBy Azev77Every undergraduate who wishes to pursue a PhD in economics is told to take a sequence of certain math classes, the hardest of which is usually real analysis. I took a real analysis course based on Rudin's blue

book and found it a painful transition from my previous courses. I had to quickly get used to reading and writing proofs. It was unclear if and how these tools can be used in economics. This book is a great solution because it helps the reader to gently transition to writing proofs and is chock-full of applications at every step. This book has three parts: The first 3 chapters introduce the reader to abstract math and proof writing techniques. The second part, chapters 4-8, teach standard material that is often covered in a 2-semester sequence on real analysis. This includes metric spaces, measure theory and probability, and L_p spaces. This also includes a chapter on convex analysis which is rarely covered in books on real analysis designed for math students. The last 3 chapters cover advanced material which is useful for readers interested in economic and econometric theory. The thing that I liked most about this book is its impressive collection of applications to economics, here are some: The first chapter on Logic discusses general equilibrium and proves the first fundamental theorem of welfare economics. In the second chapter on set theory they discuss lattices and apply these tools to introduce Monotone Comparative Statics (MCS) (which was a hot topic in the 90's and hasn't even been introduced into most microeconomics textbooks yet, not even in Mas-Colell). They explain how MCS is a generalization of regular Comparative Statics based on the implicit function theorem, which requires strong assumptions about differentiability. The discussion of real numbers in chapter 3 is very thorough, so an econ student doesn't need to follow every detail but in case he gets curious about some property of the real numbers he can always refer back to it. In chapter 4 they talk about the finite dimensional vector space of real numbers. This is a more gentle approach than I experienced when I learned analysis, because we jumped straight into general metric spaces. They apply these tools to Linear Dynamical Systems, Markov Chains, and most notably to Dynamic Programming. Chapter 5 covers finite-dimensional convex analysis, which includes all kinds of convex separation theorems and applies these tools to prove the second fundamental theorem of welfare economics. They also cover everything you ever wanted to know about constrained optimization, the implicit function theorem and Kuhn Tucker conditions in horrendous detail. The authors proceed to discuss general metric spaces and include more applications to dynamic programming generalizing many of the topics discussed in previous chapters. Chapter 7, which is a bit more technical than the previous chapters, discusses measure theory and measure-theoretic probability. This includes applications to all kinds of useful limit theorems and 0-1 laws, and a cool application to quantile estimation on page 405 and state dependent preferences on page 445. Chapter 8 introduces L_p spaces with applications to Statistics and Econometrics including a theoretical discussion of parametric and non-parametric regression. This chapter also includes an application to Artificial Neural Networks. I haven't spent much time on the final 3 chapters, though I look forward to studying Chapter 11 on expanded spaces (Nonstandard Analysis) which Berkeley's Robert M. Anderson claims can be very useful in the future. In his manuscript on Nonstandard Analysis, Anderson writes "a very large number of papers could be significantly simplified using nonstandard arguments." The applications make this the only book of its kind that I have seen. Efe Ok's text on Real Analysis assumes a stronger background than this text, and doesn't include such an eclectic collection of applications. Ok's text is more suitable for someone who wants to work in pure theory. I would have liked to have seen additional material on general topological spaces covered earlier in the text so for example their discussion of open sets in Euclidean space can be seen as a special type of topological space. I would strongly recommend this book to anyone who wants to see how mathematical analysis can be applied to economics.

7 of 9 people found the following review helpful. An excellent math econ book
By Math Econ Professor
I am not currently teaching Math Econ, but when I do again I intend to use this book. One problem with the typical first-year econ grad student is that they have little experience with theorem-proof mathematics; they are more familiar with applied mathematics, meaning that they set about to solve a given problem, than they are with the logical process of proving that problem has a solution. CSZ do a nice job of easing the student into this process, starting with the basics of mathematical logic. And they manage to cover the basics as well as some advanced topics. My only quibble is that the book gives too little attention to dynamic programming and recursive competitive equilibria. These methods are now a standard part of any macroeconomist's toolkit, but students rarely get a mathematically careful presentation that is also appropriate as a textbook (SLP is more like a reference book, albeit one where the reader must provide their own proofs). CSZ of course cannot do everything in one book, even one that is 670 pages long, but I personally would have liked to see more on these topics. As a whole, the book fills a clear need in the profession and recommend it to all incoming PhD econ students -- you should read the first couple of chapters before arriving at school in the fall. It will give you a leg up over your classmates (or catch you up) and make the transition to grad school a bit easier.

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.

From the Back Cover "I've struggled in teaching a math for economics course for several years without an appropriate text. This book will remedy this problem and, more generally, will fill a gap that has existed in the profession for at least a decade."--L. Joe Moffitt, University of Massachusetts "This book will prove extremely useful for anyone who wants to learn mathematical economics in an accessible and intuitive fashion, while still tackling advanced concepts. The range of topics is impressive, with many illuminating examples. An excellent text!"--Jaksa Cvitanic, California Institute of Technology "This book makes accessible an extraordinary amount of mathematics used in economics and carries it to a high level. By means of illustrative examples, the authors succeed in explaining most of the main ideas of economic theory. This is an important resource for economists and an excellent text for mathematics courses for economic graduate students."--Truman F. Bewley, Yale University "A much-needed textbook for graduate students and a useful desk reference for researchers, this book is of tremendous value to the economics profession because it bridges abstract mathematics and concrete economic applications. Given the current technical level required in research, knowledge of materials covered in this book is indispensable for graduate students."--Han Hong, Stanford University "Without ever sacrificing rigor, the authors have a style that will help students trying to decipher arcane mathematical ideas. I recommend this book to students."--Richard P. McLean, Rutgers University

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