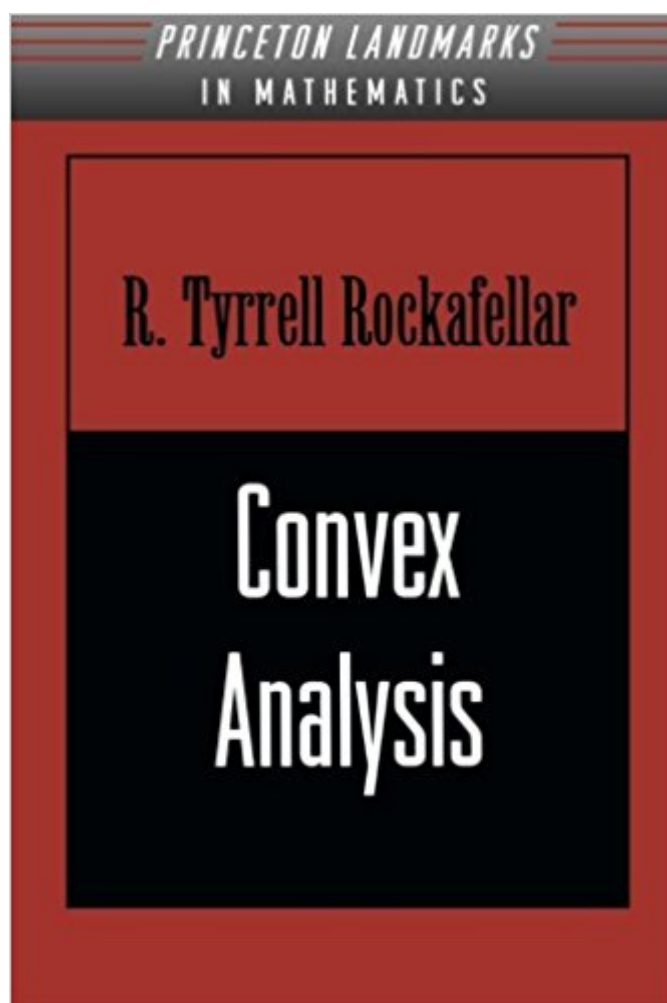The book was found

Convex Analysis (Princeton Landmarks In Mathematics And Physics)

Synopsis

Available for the first time in paperback, R. Tyrrell Rockafellar's classic study presents readers with a coherent branch of nonlinear mathematical analysis that is especially suited to the study of optimization problems. Rockafellar's theory differs from classical analysis in that differentiability assumptions are replaced by convexity assumptions. The topics treated in this volume include: systems of inequalities, the minimum or maximum of a convex function over a convex set, Lagrange multipliers, minimax theorems and duality, as well as basic results about the structure of convex sets and the continuity and differentiability of convex functions and saddle- functions. This book has firmly established a new and vital area not only for pure mathematics but also for applications to economics and engineering. A sound knowledge of linear algebra and introductory real analysis should provide readers with sufficient background for this book. There is also a guide for the reader who may be using the book as an introduction, indicating which parts are essential and which may be skipped on a first reading.

Book Information

Series: Princeton Landmarks in Mathematics and Physics

Paperback: 472 pages

Publisher: Princeton University Press (December 23, 1996)

Language: English

ISBN-10: 0691015864

ISBN-13: 978-0691015866

Product Dimensions: 6 x 1.1 x 9 inches

Shipping Weight: 1.4 pounds (View shipping rates and policies)

Average Customer Review: 4.0 out of 5 stars   8 customer reviews

Best Sellers Rank: #646,791 in Books (See Top 100 in Books)   #97 inÃ Â Books > Science & Math > Mathematics > Applied > Linear Programming   #529 inÃ Â Books > Science & Math > Mathematics > Mathematical Analysis   #7446 inÃ Â Books > Textbooks > Science & Mathematics > Mathematics

Customer Reviews

"This book should remain for some years as the standard reference for anyone interested in convex analysis."--J. D. Pryce, Edinburgh Mathematical Society

R. Tyrrell Rockafellar is Professor of Mathematics and Applied Mathematics at the University of

Washington-Seattle. For his work in convex analysis and optimization, he was awarded the Dantzig Prize by the Society for Industrial and Applied Mathematics and the Mathematical Programming Society.

In a nutshell, an exceptional book, ideal for use as a reference (completeness and organization stands out), but also excellent for self-studying too! In fact, the last part came as a pleasant surprise to me.PhD Candidates conducting theoretical research could definitely learn a great deal about writing elegant and good math from this book.You just need to understand thata) you would rather have previous exposition to abstract mathematics (otherwise I doubt it is fit for you),b) The first few sections quickly introduce you to convex analysis, but the book is huge and it is extremely ambitious to try to read it from cover to cover.c) The book is about convex ANALYSIS, NOT CONVEX GEOMETRY. It (intentionally) does not focus on the geometric interpretation of convexity and for a good reason. Many convex settings involve multiple dimensions (e.g. thousands for convex optimization problems). A geometric account is more intuitive but does not safely and readily extend to multiple dimensions, where intuition is lost or becomes error prone. That is where analysis shines, as it abstracts the geometric intuition into algebraic relations and properties. So don't expect to find fancy figures and illustrations (it has none).d) The book contains theoretical results pertaining to convex optimization, and is certainly written, in large, with that in mind. But remember, it is about the theory, NOT ABOUT THE ALGORITHMS etc. You need it to gain profound knowledge on the theoretical aspects of convexity. If you need to focus on convex optimization see e.g. the book from Stephen Boyd on Convex Optimization (also available for free on his website).PRESENTATION STYLEHe explains and motivates the introduction of every new definition, and although he is very meticulous in the proofs, most of them are really simplified and well presented. He actually breaks most results into small theorems, and he progressively builds upon previous results to prove the more complex theorems. This helps keep proofs really short and intuitively appealing.TARGET AUDIENCERemarkable clarity and depth in the exposition. However, as the author does mention, this book requires mathematical maturity to understand. The reader would rather have even a superficial exposition to abstract mathematics.COVERAGERegarding the coverage of the subject matter, I doubt there is anything missing, literally! If what you need is not there verbatim, then chances are you can readily deduce it from one of the existing theorems.ORGANIZATIONThe author has done a phenomenal job at organizing the content of the books. It really stands out! It is separated in 7 parts and 39 Sections. He also quite successfully managed to make every section as independent as possible from the rest. That, in combination with the excellent coverage, make this

book ideal as a reference.SOME MINOR DRAWBACKSPrinting quality: The book was written in the 60s, and this is a scanned reprint. The scanning quality itself is rather poor, and some symbols are rarely faded (especially small subscripts). Nothing you won't get easily used to, but I thought I should mention.Also you may notice (very very rarely) minor mistakes (e.g. duplication of letters etc) that one would expect to be corrected from such an old, classic book.

cover almost all aspect; it's easy to understand because things are discussed in R^n (rather than hilbert space, which is also a con of this book)

This is the most important and influential book ever written on convex analysis and optimization. Based on the works of Fenchel and other mathematicians from the 50s and early 60s (such as the Princeton school), Rockafellar takes the subject to a new level, with a deep and comprehensive synthesis, focused primarily on a definitive development of duality theory, and of the convex analysis that supports it. This is the place to start if you are looking for a result on the theory and convex sets and functions, or duality theory; the book is comprehensive. This is not an easy book to read, and it would benefit from illustrations and exercises (it has none). However, its value and profound influence on the field are hard to overestimate.

This book is a classic. It is probably the best reference book although it is tough to read from the beginning untill the end. The style is heavy and you need strong mathematical background to understand it.Anyway, if you need a result on convex functions or convex analysis it is very likely that you will find it in ths book.

This is a good book for the first year in PhD studies. I recommend amply this book, it's very clear in the explanation, if you have any doubts about topology, Rockafellar explained in this book very simple the theory and all you need about Topology.

A serious piece, but actually very readable. Its packed with precious jewels if you already have an exposure to convexity.

I bought the old version. I'm sure the new version is a little easier to read, maybe with some pictures included. The old version is very dense, but this can be good if you already know a bit about the field.

convex programming is a beautiful topic which admits amazing geometric interpretation.books like this manage to destroy one's appreciation of the topic by not providing even one (gasp!) figure. damn Bourbaki style.

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