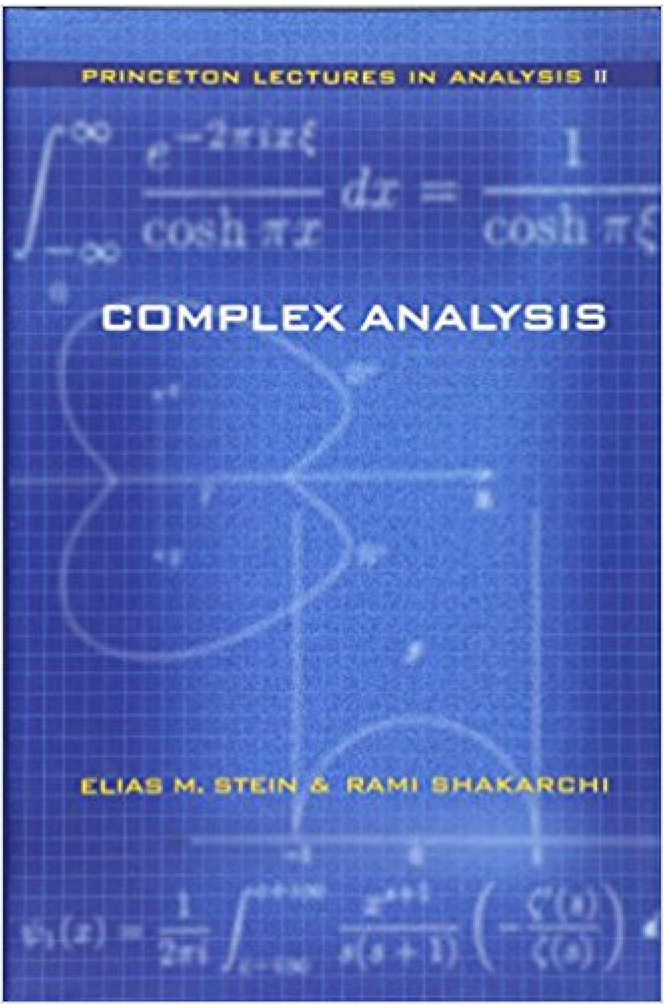
Complex Analysis (Princeton Lectures In Analysis, No. 2)



Synopsis

With this second volume, we enter the intriguing world of complex analysis. From the first theorems on, the elegance and sweep of the results is evident. The starting point is the simple idea of extending a function initially given for real values of the argument to one that is defined when the argument is complex. From there, one proceeds to the main properties of holomorphic functions, whose proofs are generally short and quite illuminating: the Cauchy theorems, residues, analytic continuation, the argument principle. With this background, the reader is ready to learn a wealth of additional material connecting the subject with other areas of mathematics: the Fourier transform treated by contour integration, the zeta function and the prime number theorem, and an introduction to elliptic functions culminating in their application to combinatorics and number theory. Thoroughly developing a subject with many ramifications, while striking a careful balance between conceptual insights and the technical underpinnings of rigorous analysis, Complex Analysis will be welcomed by students of mathematics, physics, engineering and other sciences. The Princeton Lectures in Analysis represents a sustained effort to introduce the core areas of mathematical analysis while also illustrating the organic unity between them. Numerous examples and applications throughout its four planned volumes, of which Complex Analysis is the second, highlight the far-reaching consequences of certain ideas in analysis to other fields of mathematics and a variety of sciences. Stein and Shakarchi move from an introduction addressing Fourier series and integrals to in-depth considerations of complex analysis; measure and integration theory, and Hilbert spaces; and, finally, further topics such as functional analysis, distributions and elements of probability theory.

Book Information

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Customer Reviews

Elias M. Stein is Professor of Mathematics at Princeton University. Rami Shakarchi received his Ph.D. in Mathematics from Princeton University in 2002.

The authors are great writers, who present the topic in a valuable historical context. Nevertheless, this book moves fast -- all the beautiful results that distinguish the "nice" behavior of complex functions with derivatives from differentiable functions of real variables are proved in the first three chapters. It then quickly goes on to discuss more advanced results relating to Fourier analysis (most notably, the Paley-Wiener theorem) and techniques (e.g., the Phragmen-Lindelof principle), followed by some interesting applications of complex analysis to number theory.For a first undergraduate course in complex analysis for math majors (i.e., a very theoretically oriented one, not all that concerned with computing contour integrals), coverage of the first four chapters plus a few selected topics should already make for a fast paced course, despite what the preface of the text claims. A course in real analysis based on Rudin’s Principles of Mathematical Analysis should probably be considered a prerequisite. The proofs are written in a way for someone already quite comfortable with rigorous arguments, with the reader expected to be able to supply the routine epsilon-delta manipulations that are left out when the authors feel like they are tedious.

I didn’t care much for my complex analysis class as it seemed to computational with not as much care in the theory as I’d like. Luckily for me, this book filled in all the gaps and more in just the first few chapters. The section on branch cuts and the log function should appear slightly earlier and for that I’d suggest skimming that section after reading chapter 1 (log function in chapter 4). Other than that great book for beginning complex analysis.

The two authors are indeed very good writers. This book presents the elements of complex analysis at the graduate level (so the assumption is that the reader has gone through undergraduate real and complex analysis). All the topics covered are covered well (I especially like their treatment of the Prime Number Theorem and Elliptic Functions). Note: theorems of Picard and Mittag-Leffler are not proved in the textbook - they are actually assigned as exercises for the reader to prove). If you need the proofs of these theorems, look them up elsewhere. Overall, a very solid book.

Great edition of a great book!

great book

This is the best book on complex variable valued functions I have ever read.Innovating manner of introducing some subjects which in some traditional books are treated in a more complicated way.

I got a copy of this book. It is a text for undergraduate students in pure mathematics. It is a good reference for elementary proofs of most common theorems in complex variables. However, some important theorems (ej: Three lines lemma and Picard theorem) are placed as exercises and problems. It is not a book for applications in engineering, its applications are taken from number theory. At some places it refers to sections or chapters in other books in the Princeton lectures in analysis. I think this is a four starts book.

Very useful book in very good conditions

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