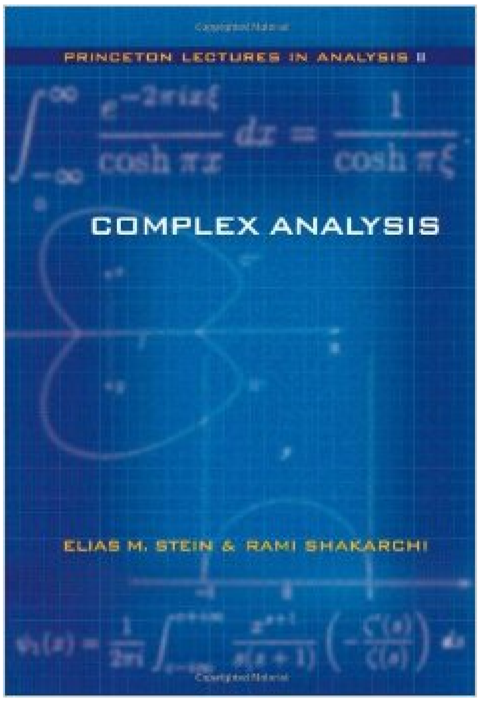
# Complex Analysis (Princeton Lectures In Analysis, No. 2)



## 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

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.

This is a very beautifully written book on complex analysis. It is not very easy to read though, especially if you've never been exposed to the subject before. Most proofs are clearly presented, and can be easily understood by the mature reader. Other proofs require filling in the gaps to get the whole picture. As far as problems go, there's a list of relatively easy exercises at the end of each chapter. Following the exercises is a list of problems which require some head scratching. Overall, I had a fun time reading and learning from this book.

Very good first book for complex analysis.Pros:- Get to the point real quick. All the basic big theorems (Cauchy integral formula, open mapping theorem etc) are in the first three chapters. Even talks about Runge's theorem early on, which is nice.- Is also a good introduction to analytic number theory. Built up basics of Gamma function and zeta function which cumulates to the proof of prime number theorem.Cons:- If you only want to learn about computations, this is not the book for you.I strongly prefer this to Ahlfors. (I never understand why people like it)

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 on 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.

As others have said, the book is very nice to read, the exposition is clear, motivated, and meaningful. It does take quite a bit of work to get through the book, however, the efforts will be rewarded very well with a good solid understanding of complex analysis.Much of the books content is actually contained in the exercises in the back of each chapter, so it is very important to work through the exercises. Many important concepts are developed by the reader, guided by the book, in the exercises. Sometimes preliminaries to matters developed in later chapters are seen in the exercises.If you plan to self study complex analysis then this book will be a very good challenge. This book would also be a good companion book to any complex analysis class(or a very good primary text).

Not good as a reference book. I believe it's more valuable as a part of the series which should be used in order.This volume, second book of the series, relies on the material from the first book.Some proofs have gaps (without the magic word "clearly") and occasionally (very rare) fall into the category of proofs by intimidation.The difficulty of the exercises and problems is very subjective. Some starred problems were much easier than some of the exercises. Some hints to the problems resolve the problem completely (i.e. take all the fun away) and others send you on a very roundabout way to the solution.There is very little topology involved, and much of the analysis techniques are not fully exploited (because much of it is introduced in the following volumes).

If possible, I would give this book 4.5 starts, just because I don't think it is quite as good as the great classic by Conway, "Functions of One Complex Variable" (which treats all the standard topics). On the other hand, Stein and Shakarchi's book is beautiful, lucid, and obviously written by one of the grandmaster analysts of our time. Also, I give it five stars for including a beautiful treatment of the Paley-Wiener theorem, a topic that doesn't usually make its way into elementary complex analysis texts. Finally, this book has the best treatment I've seen of the Hadamard factorization theorem.



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