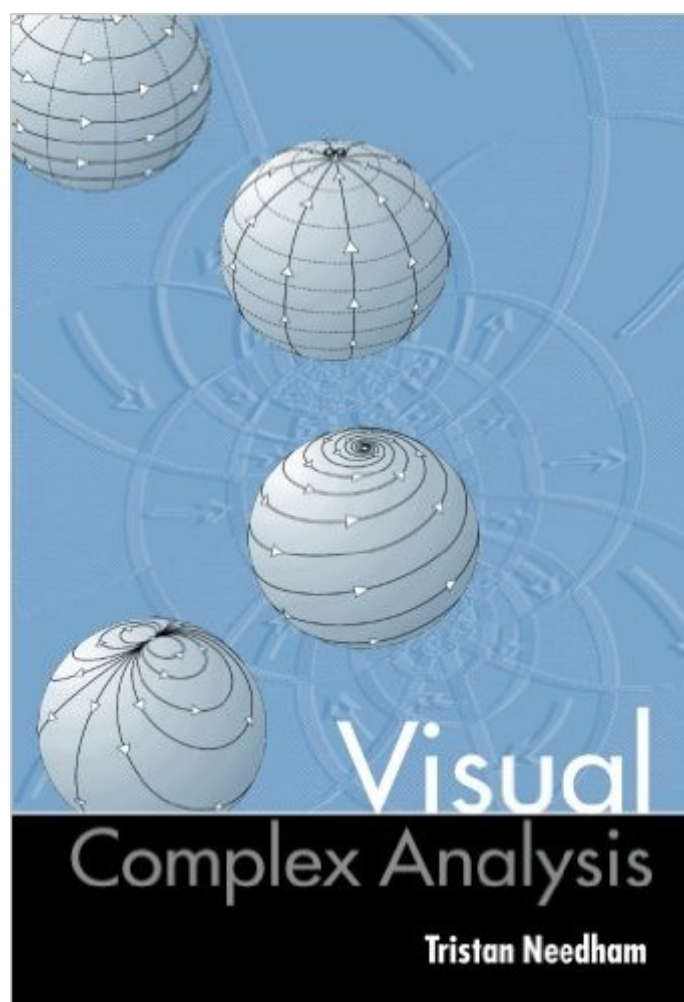


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# Visual Complex Analysis



## Synopsis

This radical first course on complex analysis brings a beautiful and powerful subject to life by consistently using geometry (not calculation) as the means of explanation. Aimed at undergraduate students in mathematics, physics, and engineering, the book's intuitive explanations, lack of advanced prerequisites, and consciously user-friendly prose style will help students to master the subject more readily than was previously possible. The key to this is the book's use of new geometric arguments in place of the standard calculational ones. These geometric arguments are communicated with the aid of hundreds of diagrams of a standard seldom encountered in mathematical works. A new approach to a classical topic, this work will be of interest to students in mathematics, physics, and engineering, as well as to professionals in these fields.

## Book Information

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## Customer Reviews

Needham's book is a masterpiece which will be appreciated by anyone who already has gained (or is simultaneously gaining) a firm knowledge of the traditional, i.e. more algebraic, approach to complex analysis. In addition to reading it for pleasure, I have used the book extensively in teaching 18.04 Complex Variables with Applications at MIT, not as a required textbook, but rather as inspiration for lectures and homework problems. The book helps me give the students (mostly undergraduates in applied mathematics, science, and engineering) the geometrical insights needed for a deeper understanding of the subject, beyond what is found in various standard texts, such as Churchill and Brown or Saff and Snider (the required textbook for 18.04). As a prelude or companion to Needham's book, however, I would recommend reading one of these other books and

working through more straightforward examples of algebra and calculus with complex functions. With that said, Needham's book is a perfect supplement to a first course in complex analysis. Needham's book is unique in its clear explanation of how the rich properties of analytic functions all follow from the "ampli-twist" concept of complex differentiation. In my class, I use this crucial, geometrical idea from the first mention of the derivative, where it goes hand in hand with the concept of conformal mapping (which is often at the back of introductory texts, but which I think should appear near the beginning). Perhaps the most delightful section of Needham's book is the one where he uses the same ampli-twist concept to give a very intuitive, unified proof of Cauchy's theorem, Morera's theorem, and the fact that a loop integral of the conjugate gives  $2i$  times the area enclosed.

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