

Complex Variables

by R. B. Ash and W.P. Novinger

Preface

This book represents a substantial revision of the first edition which was published in 1971. Most of the topics of the original edition have been retained, but in a number of instances the material has been reworked so as to incorporate alternative approaches to these topics that have appeared in the mathematical literature in recent years.

The book is intended as a text, appropriate for use by advanced undergraduates or graduate students who have taken a course in introductory real analysis, or as it is often called, advanced calculus. No background in complex variables is assumed, thus making the text suitable for those encountering the subject for the first time. It should be possible to cover the entire book in two semesters.

The list below enumerates many of the major changes and/or additions to the first edition.

1. The relationship between real-differentiability and the Cauchy-Riemann equations.
2. J.D. Dixon's proof of the homology version of Cauchy's theorem.
3. The use of hexagons in tiling the plane, instead of squares, to characterize simple connectedness in terms of winding numbers of cycles. This avoids troublesome details that appear in the proofs where the tiling is done with squares.
4. Sandy Grabiner's simplified proof of Runge's theorem.
5. A self-contained approach to the problem of extending Riemann maps of the unit disk to the boundary. In particular, no use is made of the Jordan curve theorem, a difficult theorem which we believe to be peripheral to a course in complex analysis. Several applications of the result on extending maps are given.
6. D.J. Newman's proof of the prime number theorem, as modified by J. Korevaar, is presented in the last chapter as a means of collecting and applying many of the ideas and results appearing in earlier chapters, while at the same time providing an introduction to several topics from analytic number theory.

For the most part, each section is dependent on the previous ones, and we recommend that the material be covered in the order in which it appears. Problem sets follow most sections, with solutions provided (in a separate section).

We have attempted to provide careful and complete explanations of the material, while at the same time maintaining a writing style which is succinct and to the point.

© Copyright 2004 by R.B. Ash and W.P. Novinger. Paper or electronic copies for non-commercial use may be made freely without explicit permission of the authors. All other rights are reserved.