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Bücher und Computersoftware

Donald Sarason: Complex Function Theory, Second Edition. xii+163 pages, $ 39.–. American Mathematical Society, 2007; ISBN 978-0-8218-4428-1.

The first edition of the book under review was published under the title *Notes on Complex Function Theory* in 1994. Before presenting a more detailed description, let us just say that the exposed material is an introductory course in complex analysis, as the author claims, in the same spirit as the classical books *Complex Analysis* by L.V. Ahlfors (McGraw-Hill, 1979) and *Analytic Functions* by S. Saks and A. Zygmund (Elsevier, 1971).

Among the numerous monographs and textbooks on the same subject, Sarason's seems to be one of the clearest and most concise. The first chapter starts from the very basic construction of the complex numbers and ends with the stereographic projection and the definition of the Riemann sphere. It is followed logically by elementary complex differentiation and the equivalence between conformality and holomorphy (with non-zero derivative). Then linear-fractional transformations and standard elementary complex functions are studied (exponential, logarithm and trigonometric functions), without using power series which are defined and studied later. Cauchy's theory and its usual consequences cover one third of the book, starting with integration along piecewise C^1 curves and ending with Runge's Approximation Theorem, but it does not contain the residue theorem, though. The latter is proved in the last chapter which contains Cauchy's Theorem for simply connected domains and which culminates with the Riemann Mapping Theorem. The book ends with four brief appendices, three being devoted to various aspects of differentiation needed in the main body of the text, and one devoted to groups of linear-fractional transformations. Many exercises are spread out in the various sections, mostly at places where the related theoretical material is exposed. Finally, I only have a tiny regret concerning the book's content: In Chapter IV the author gives a very nice, intuitive introduction to the Riemann surface associated to $\sqrt{z}$, and I think that he should have added a section on that matter.

In conclusion, the book under review is very well written and it should be helpful to anyone who has to teach either an introductory or a more advanced course on complex analysis. I would advise such instructors to use D. Sarason's book together with J. Conway's *Functions of One Complex Variable* (Springer-Verlag, 1973) and W. Rudin's *Real and Complex Analysis* (McGraw-Hill, 1966) as all three offer different, enlightening and complementary features of the subject.

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