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Fonctions analytiques. (Analytic functions). (French)

Mathematiques pour l'Ingenieur. Paris: Ellipses. 182 p. FF 110.00 (1996).
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The book under review is a rigorous textbook on elementary function theory in French language. In contrast to most other textbooks on elementary function theory, the author of the book under review takes Weierstrass's point of view, and starts with complex power series. This has the advantage that the most results about complex analytic functions are easier to obtain, and the more difficult material can be treated later. A second non-standard feature of the book under review is the systematical treatment of special functions. Besides the gamma, beta and zeta functions the book covers hypergeometric series, Bessel functions, the error function, and classical families of orthogonal polynomials. The following lists the contents of the book: Chapter 1 (The founding fathers) gives a historical survey about the development of function theory. In Chapter 2 (Power series) complex power series are considered, differentiability is defined in Weierstrass's sense, and analytic continuation and asymptotic series are treated. The complex integral follows in Chapter 3 (Cauchy theory), Cauchy's theorem and Cauchy's integral formula are next. Then Liouville's theorem and the fundamental theorem of algebra follow. Furthermore, the Cauchy-Riemann differential equations and Morera's theorem are covered. Finally, uniform convergence and infinite products are considered. Chapter 4 (Residue calculus) deals with isolated singularities and Laurent series. Rouche's theorem and the inversion of analytic functions are next. Then the Mittag-Leffler theorem and Weierstrass's product theorem are covered, and real definite integrals are considered. Chapter 5 (Conformal mappings) is about linear transformations, the Dirichlet problem and the Schwarz-Christoffel transformation. In my opinion this is a very nice book, worth to be considered for course adoption, since it presents elementary function theory in a quite algebraic way, not too complicated, and nevertheless including many applications. The only drawback of the book might be that it is written in French.

Wolfram Koepf (Leipzig)

Classification:

- **30-01** Textbooks (functions of one complex variable)