D is symmetric; homogeneity is not enough.) This is the beginning of the theory of automorphic functions. In one variable, if Γ is the modular group, $\Gamma\backslash D$ gives, through the theory of the Weierstrass $\wp$-function, the natural parametrization of the possible complex structures on the 2-torus. In the general case there are similar families of Abelian varieties. These are Kuga's fiber varieties, which are constructed in the book in the author's own way, and their algebraicity is proved.

As to the organization of the book, it contains five chapters of roughly equal length. The first two summarize the essential facts about algebraic groups and semisimple Lie groups with a few proofs, and give the Jordan algebra prerequisites with concise proofs. The third is about Cayley transforms and boundary structure, and the fourth about equivariant holomorphic maps, culminating in the results about Kuga's fiber varieties. Chapter 5 gives more detail about the Lie algebra of $\mathrm{Aut}(D)$ for the half-plane version of D; it includes, up to a point, nonsymmetric domains. There is also an Appendix, where the classical domains are explicitly constructed.

The book is not easy to read because of its conciseness and because of the many prerequisites, such as linear algebraic groups, that it constantly uses. On the other hand, it is very carefully written and organized; everything is in its place. It has a good index and index of notations, and a very detailed bibliography. Also, despite the unfortunate circumstance that this review is written so long after the book's publication, it is still the only book on this subject.

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Numerical methods for initial value problems in ordinary differential equations, by S. O. Fatunla. Academic Press, London, 265 pp., $44.50. ISBN 0-12-249930-1

For many years the textbooks by Gear [2] and by Lambert [7] and the summer school proceedings edited by Hall and Watt [4] have been considered the standard references in the numerical solution of initial value problems in ordinary differential equations (odes). All these build on the classic books by Henrici [5, 6]. Between them these texts covered most of what was generally considered important for students of the subject in the 1970s. As these texts have aged and the subject has matured, many practitioners in the field have felt the need for books which present the recent major theoretical advances and draw together the many practical strands of this diverse area. Recently, many of these needs have been met by two excellent books. These are the theoretical reference text by Butcher [1], with its encyclopedic bibliography, and the well-received textbook by Hairer, Norsett, and Wanner [3]. The former concentrates on Runge-Kutta and general linear methods for nonstiff and stiff problems and the latter on a variety of methods for nonstiff problems. For practical advice, neither replaces the book by Gear [2], even less that of Shampine and Gordon [8] which describes and analyzes software in considerable depth. An up-to-date text summarizing recent advances and modern practices in mathematical software for ode initial value problems is still awaited.

The book under review is intended mainly as a reference text. It will serve as a fairly comprehensive introduction to methods and their analysis for initial value odes. Indeed, here are discussed a number of techniques which do not appear in many of the above texts. For example, a variety of methods for singular problems are outlined. Also, P-stable methods for second-order equations are introduced and analyzed.

There are 11 chapters. The first two introduce the reader to basic concepts in odes and their numerical solution. The next two discuss one-step algorithms with particular emphasis on Runge-Kutta methods, both explicit and implicit. There follows a chapter on linear multistep methods. Two chapters on methods for singular and discontinuous problems with special emphasis on extrapolation techniques and nonpolynomial methods conclude the part of the book on nonstiff problems. Next, there is a chapter on stiffness and stability criteria. This includes an introduction to various nonlinear stability criteria and the concept of contractivity. The next chapter on algorithms for stiff problems introduces many of the most popular techniques currently implemented. There follows a discussion of multistep and multiderivative methods for second-order initial value problems. Finally, a brief useful discussion of ode software is included.

This text will be most useful to those who need a brief and light introduction to modern developments in numerical techniques for initial value odes and for those who wish to explore some of the less widely known techniques for special problems. For a deeper understanding of the subject, the reader may need to turn to one of the other texts mentioned above. There is a good bibliography of over 600 references. Peculiarly, the page numbering in the text does not correspond to that in the list of contents.

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Infinite crossed products, by D. S. Passman. Academic Press, New York, 460 pp., $84.50. ISBN 0-12-546390-1

Classically, crossed products of arbitrary finite groups over fields were introduced by E. Noether in 1929 in her lectures in Göttingen [vdW]. Earlier, the special case of cyclic algebras was defined by Dickson in 1906 [D1, D2]; the first significant result about them was proved by Wedderburn in 1914 [W]. These crossed products