series, integrals with parameters, line integrals, Green's theorem, Gamma function, Fourier's integral, differential equations. The style is rather conversational in places, to say the least (e.g. 242-3) and sometimes too short (cf. the use of the word "infinitesimal" on p. 301 after its definition in a short clause on p. 76). But in return a number of conventional errors and misunderstandings of "older books" are pointed out. Some of the peculiar features in the book are explained by the author himself in the preface (p.iv):"... that the only way in which the student can hope to attain mastery of the subject, is to write his own book. He should take each theorem by itself, state it in his own language, and prove it as the author ought to have proved it for that student's need. The clearer the presentation in a text-book is, the worse for the student who would rely on reading." It is clear that only a master like Osgood could produce a useful book based on this principle. For details in proofs and otherwise, reference is often made to the author's well known books on Calculus and on Advanced Calculus, as well as to the Real Analysis part of his classic "Funktionentheorie" Vol.I; for some generalization concerning several variables he even refers to "Funktionentheorie" Vol.II, 1. "Functions of a Complex Variable" is essentially a reproduction in English of the central part of the Author's "Funktionentheorie I", to which he frequently refers for details. There is an introduction of the complex numbers and an exposition of the main theorems of the Cauchy-Riemann-Weierstrass theory. The book ends with a proof of the Riemann mapping theorem for a closed region bounded by analytic arcs, not tangent to each other, based on the construction of Green's function (prepared in the preceding chapter on the logarithmic potential) followed by sketchy notes on special cases of conformal mapping (polygon mapping etc.). In view of the great variety of good introductions to real as well as complex analysis which are available now the reviewer feels that the main reason for the new edition of these books was to make the essence of Osgood's German classic "Funktionentheorie I" available to the English reader.

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Introduction à l'algèbre supérieur et au calcul numérique algébrique, by L. Derwidué. Masson et Cie. Editeurs, Paris 1957. 432 pages. Price bound 6,600 fr.

In his preface the author states that algebra is the branch of mathematics most frequently used not only in the development of many parts of pure mathematics, but also in the sciences and in engineering. His aim was to write a book in which all sections of algebra, most likely to occur in this way, are taken care of from the theoretical as well as from the practical point of view. In fact none of the existing books on numerical methods presents so much theoretical groundwork accessible to a beginner, while only few of the texts on higher algebra will confront the reader with numerical details, computing schemes, and example work. Thus a student who likes to have all these things, combined with accurate historical references as well as hints to the more recent literature on a great number of special topics, all in one volume, will be very happy with the book.

It begins with a short Chapter on the use of mechanical computing machines and on complex numbers. Chap. II deals with determinants and systems of linear equations, including numerical methods. Chap. III "General theory of polynomials and rational functions" starts with a simple proof of the fundamental theorem of algebra; there follow interpolation formulae and literal solutions of special equations; partial fractions. Chap. IV "Elimination", including symmetric functions and a classical approach to algebraic geometry around Bezout's theorem. Chap. V "Numerical solution of algebraic equations" (70 pp.) discusses the majority of the established methods and one or two less well known ones. Chap. VI and VII contain a fairly complete and readable account of the elements of matrix algebra (about 100 pp.) with a number of points not readily found elsewhere in a book of this type. Reality of the roots of a symmetric matrix is proved by means of Sturm's theorem. No use is made of any elaborate symbolism at this stage and also the orthogonal group is introduced in terms of coordinates. Misplaced in Chap. VI one finds a reduction of the equation of the fifth degree by Tschirnhausen transformation to the Bring-Jerrard form, at least indicated. The matrix algebra offered in Chap. VII suffers from one defect; unconventional and unsystematic notations. After the elementary rules there follows a theory of eigen vectors including numerical methods, discussed on examples with decimals up to 7 places after the point. Euclidean and hermitean space. Unitary group and normal matrices. Symmetric and hermitean forms with some repetition of earlier results that could easily have been avoided. Finally elementary divisors and Jordan normal form. Chap. VIII is devoted to applications: stability criteria of Routh and Hurwitz by the method of Schur. Some parts of this chapter, mainly at the end, are rather sketchy. The last chapter discusses the beginnings of group theory and "abstract algebra". Its 'avertissement' gives (for the third time in the work) an apology for the absence of Galois theory. It follows a subsection (of less than one page) on "Ensemble" (set theory) where the axiom of choice is presented in the following absurd form: "On suppose que tous les éléments e de E sont distincts les uns des autres, c'est à dire que tout e possède des propriétés spéciales qui le distinguent de n'importe quel autre e." Like most other statements in this section, even if it were correct, it is entirely irrelevant for the following discussion. The notes on groups and group representations will be of interest for the reader of the sections on matrix groups in earlier parts of the book. The little more than two pages on ring and ideal theory, vector spaces, and linear algebras, however, can hardly be helpful to a beginner. The appendix "Sur les déterminants de Hurwitz ... " contains some original results concerning the location of the roots of certain algebraic equations ocurring in the theory of networks and servomechanisms.

Apart from a great number of worked numerical examples in connection with almost every theorem which lends itself for this purpose, there is plenty of exercise material without answers.

In teaching and in research much stress is given at present to numerical methods and explicit constructions; therefore the book will be welcomed by many teachers and students who will find in it valuable information on a great number of special questions.

H. Schwerdtfeger, McGill University

Sound Pulses, by F.G. Friedlander. Cambridge University Press, The Macmillan Company of Canada, 1958. 199 pages. Canadian List Price $6.75.

The method of studying wave motion most familiar to applied mathematicians is that of harmonic wave trains, and resolution into Fourier components. The volume under review is a well-considered study of a quite opposite viewpoint, more familiar to pure, or existentialist, mathematicians. This is the method of characteristics, or wave fronts, which is here applied to acoustic problems of a wide variety.

After an introductory chapter in which the wave equation is derived, and the approximations under which it is valid are discussed, the author turns to wave fronts and characteristics. Dependence and influence domains, the reflection and diffraction of wave fronts, and caustics are discussed. In the third chapter, entitled geometrical acoustics, the theory of distributions is introduced, together with the concept of weak solution of a differential equation. This leads to a discussion of the transport of singularities of various orders.

Particular reflection problems are worked out in the fourth chapter, with special attention being given to the reflection of spherical pulses by a paraboloid.

The last two chapters concern diffraction, a topic which is approached mathematically by the construction of appropriate Green's functions, and the asymptotic development of the integ-