

Chapter VII, *The binary symmetric channel*, deals with the case of two message symbols, two received signals such that $p(y_1|x_1) = p(y_2|x_2) = q > (1/2)$. This is the simplest nontrivial case and the idea is to find how the probability of incorrect reception goes to zero with the length of the block.

A comparison of Feinstein's book with the English translation of Khinchin's papers is in order. Both of these books represent an enormous advance in clean mathematical presentation of this material over previous books. Khinchin's book is excellent and readable. It is leisurely, while assuming more mathematical sophistication of the reader, including martingale convergence theorems, it is relatively self complete and does not require as much specialized material as does some of the recent periodical literature. The work is more motivated than is typical of presentations from this side of the Atlantic. Khinchin's work, as stated before, is historically important insofar as it provided the first complete critical survey of the subject, sorted out the open problems, and broke the barrier to serious treatment of the subject. It may be the more attractive to a mathematical reader.

Feinstein's book is addressed to an engineering audience. As such it is well motivated and unusually careful and mathematically clean. For example, while Khinchin slipped in his formulation of a discrete channel with memory, making his work wrong at one point (see K. Takano, *On the basic theorems of information theory*, Ann. Inst. Statist. Math. vol. 9 no. 2 (1957) pp. 53-77), Feinstein does not make this slip. Feinstein's work is more recent and the Remarks at the ends of chapters are devoted in part to valuable discussions of open questions, although publication of recent papers including one by Feinstein himself, make these comments outdated.

One minor negative comment. The author's habit, which follows some engineering practice, of using the same letter for each probability distribution and distinguishing among distributions by using different letters for the sample points, e.g. using $p(x)$ and $p(y)$ to denote input probability distribution and output probability distribution, can be confusing.

S. SHERMAN

Funkcje Rzeczywiste. By Roman Sikorski. (Monografie Matematyczne, vol. 35). Warsaw, Państwowe Wydawnictwo Naukowe, 1958. 534 pp.

The introduction to this Monograph contains an account of the ideas and theorems of set theory and topology, necessary for the understanding of the subject treated in the book, which is divided

into three parts. In the first part, the idea of continuity of a function is studied extensively. The second part develops Lebesgue's integration, together with a detailed treatment of abstract measure theory and the Stieltjes integral. It contains also a treatment of the more important properties of differentiability of functions. Chapter V gives an account of theory of Baire functions, and Chapter X presents the theory of distributions of Schwartz. Chapter XII contains an introduction to the theory of function spaces and functional analysis. The third part of the book deals with applications of the theory of Lebesgue integration to orthogonal series, and to Fourier series and the Fourier integral.

The treatment of all this material is outstanding by its great clarity and in showing how the deeper results of set theory and the abstract theory of measure find applications in functional analysis in general, and the theory of orthogonal series. The theorems are presented in as general a form as possible without destroying the simplicity of their formulation.

S. ULAM

Algebraic varieties. By M. Baldassarri. (Ergebnisse der Mathematik und Ihrer Grenzgebiete, vol. 12, new series). Berlin, Springer, 1956. 195 pp. DM 36.

The author asserts that it is his purpose to present the most important aspects of modern algebraic geometry as completely as space allows. Naturally, such a task involves the rejection of much material that could claim the right to be included and perhaps the inclusion of some that could with reason be rejected, so that any particular selection of topics is necessarily open to question. The author's selection for this monograph seems to have been guided by the desire not only to present a survey of results obtained by algebraic, analytic and topological methods, but also to show how these methods complement each other in dealing with some of the central problems in the theory of algebraic varieties defined over the complex field. In the opinion of the reviewer, he has achieved a high degree of success. The monograph presents a comprehensive though not exhaustive account of several of the major developments of the past two decades that conforms in every respect to the exacting standards of the *Ergebnisse* series.

An introductory chapter on algebraic foundations modelled on Samuel's *Ergebnisse* tract is followed by six chapters devoted largely to results achieved by purely algebraic methods. The first of these (Chapter II) contains an account of Zariski's work on the problem of