

ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross-references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

356. Mr. Garrett Birkhoff: *The composition of modular algebras.*

By a *modular algebra* is meant a group, with or without operators, ring, or hypercomplex algebra. The paper is a systematic study of the ways of building up complex modular algebras from simple constituents. The main contributions are: (1) the general formulation of some new methods of combining algebras, (2) the exact correlation of analogous methods of combination, (3) the extension and simplification of some results of Remak (Journal für Mathematik, 1930–1932) concerning canonical decompositions of finite groups. (Received October 1, 1935.)

357. Mr. Nelson Dunford: *A particular sequence of step functions.*

It is the purpose of this note to establish the existence of a sequence of positive step functions $f_n(t)$ having the property that $f_n(t) = 0$ except for a set whose measure approaches zero with $1/n$ and such that for every summable function $g(t)$, except for those in a certain set of the first category in L , the sequence $\int_0^x f_n(t)g(t)dt$ is everywhere dense in the space of measurable functions. (Received September 30, 1935.)

358. Mr. Nelson Dunford: *Linear operations on L_p to L_q .*

It is the purpose of this paper to establish the following representation theorems. The general linear operation on L to L_2 is given by the formula $Tf = \int_0^1 K(P, Q)f(P)dP$ where the kernel $K(P, Q)$ is measurable, is in L_2 for each P , and the $\text{ess. sup. } [\int_0^1 |K(P, Q)|^2 dQ]^{1/2} < \infty$. This bound gives the norm of T . For a measurable kernel satisfying the relation $[\int |K(P, Q)|^q dQ]^{1/q} \in L_{p/p-1}$ the above transformation is completely continuous on L_p to L_q and the general linear operation is always the limit of a sequence of transformations of this type. The general linear operation on L to a Hilbert space X is given by $Tf = \int x(P)f(P)dP$ where $x(P)$ is an essentially bounded and measurable function with values in X and the integration is in Bochner's sense. Every abstract measurable function $f(P)$ on $(0, 1)$ to L_q and satisfying the condition $\|f(P)\| \in L_p$ can be represented by a measurable function $K(P, Q)$ such