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.

203. J. W. Calkin: *A quotient ring over the ring of bounded operators in Hilbert space.* I.

Let $\mathcal{B}$ denote the ring of bounded everywhere defined operators in Hilbert space $\mathfrak{H}$. The subset $\mathcal{C}$ of totally continuous operators is a two-sided ideal in $\mathcal{B}$ in the ordinary algebraic sense, and the quotient ring $\mathcal{B}/\mathcal{C}$ can be constructed in the usual way; moreover, since $\mathcal{C}$ is closed with respect to the operation *, this operation can be defined in $\mathcal{B}/\mathcal{C}$ too. Defining a norm in $\mathcal{B}/\mathcal{C}$ by the equation $|\alpha| = \text{g.l.b.}|A|$, A in α, where $|A|$ is the bound of the operator A in $\mathfrak{H}$, the author shows that $\mathcal{B}/\mathcal{C}$ is a complete metric space. Further, he shows that there exists a unitary space $\mathfrak{L}$ (nonseparable, however) and a set $\mathcal{M}$ of bounded everywhere defined operators in $\mathfrak{L}$ which is a $(+, \cdot, *)$-isomorphism of $\mathcal{B}/\mathcal{C}$. In addition, if $T(\alpha)$ denotes the element of $\mathcal{M}$ corresponding to α in $\mathcal{B}/\mathcal{C}$, the bound of $T(\alpha)$ is $|\alpha|$. Thus the correspondence $\mathcal{B}/\mathcal{C} \longleftrightarrow \mathcal{M}$ is an isometry, and $\mathcal{M}$ is an algebraic ring of operators closed in the uniform topology. Other results are: If $\mathfrak{I}$ is an arbitrary two-sided ideal in $\mathcal{B}$, either $\mathfrak{I} \leqq \mathcal{C}$ or $\mathfrak{I} = \mathcal{B}$. Every self-adjoint transformation $T(\alpha)$ in $\mathcal{M}$ has a pure point spectrum. (Received February 24, 1940.)

204. J. W. Calkin: *A generalization of a theorem of Weyl.*

The paper defines the augmented resolvent set of a bounded operator A in Hilbert space $\mathfrak{H}$ as the set of values of λ such that $\mathfrak{R}(A-\lambda I)$, the range of $A-\lambda I$, is closed, while $\mathfrak{H} \ominus \mathfrak{R}(A-\lambda I)$ and the manifold of zeros of $A-\lambda I$ each have a finite dimension number. It then proves, by recourse to very simple properties of the homomorphism $\mathcal{B} \to \mathcal{M}$ defined in abstract 46-5-203, that two operators A and B whose difference is totally continuous have the same augmented resolvent set. Since, for a self-adjoint A, the complement of this set is precisely the set of Häufungspunkte of the spectrum of A in the sense of Weyl (Rendiconti del Circolo Matematico di Palermo, vol. 27 (1909), pp. 373–392), Weyl's theorem to the effect that the latter set is the same for any two self-adjoint operators whose difference is totally continuous follows at once. (Received February 24, 1940.)

205. J. W. Calkin: *Functions of several variables and absolute continuity.* I.

The author studies various properties of real- and complex-valued functions of n real variables which are potential functions of their generalized derivatives in the sense of G. C. Evans. It is shown that every such function is equivalent to a function differentiable with respect to each variable almost everywhere (previously proved by