depend on the remainder in the division of t^k by $\psi_m(t)-F_m$ and $\psi_m(t)$ respectively. (Cf. H. L. Lee, Duke Math. J. vol. 9 (1943) pp. 277–292.) (Received July 19, 1943.)

202. W. V. Parker: *Limits to the characteristic roots of a matrix.*

Let $A=(a_{ij})$ be a square matrix of order n with elements in the field of complex numbers; and define $S_i=\sum_{j=1}^n|a_{ij}|$, $T_j=\sum_{i=1}^n|a_{ij}|$, $U_i=2|a_{ii}|-S_i$, and $V_j=2|a_{jj}|-T_j$. Let S, T be the greatest of the S_i, T_j, respectively; and let U, V be the least of the U_i, V_j, respectively. It is shown that the absolute value of each characteristic root of A is not less than the greater of the numbers U and V and is not greater than the smaller of the numbers S and T. Similar bounds are also found for the real and imaginary parts of the characteristic roots. (Received July 23, 1943.)

203. H. E. Salzer: *Table of first two hundred squares expressed as a sum of four tetrahedral numbers.*

The following empirical theorem is conjectured: Every square integer is expressible as the sum of four positive (including zero) tetrahedral numbers $(n^3-n)/6$. It has been verified by a table prepared for the first 200 squares. This empirical theorem is a partial improvement of the statement that five non-negative tetrahedrals suffice for any integer. (See F. Pollock, Proc. Roy. Soc. London Ser. A. vol. 5 (1850).) (Received June 4, 1943.)

Analysis

204. R. H. Cameron and W. T. Martin: *Transformations of Wiener integrals under translations.*

Let $F[y]$ be a functional defined and Wiener summable over the space C consisting of all functions $x(t)$ continuous in $0\leqq t\leqq 1$ and vanishing at $t=0$. In addition, let F be continuous and let it be bounded over every bounded set $x(\cdot)$ of C. (F is called continuous if $F[y^{(n)}]\rightarrow F[y^{(0)}]$ whenever $y^{(n)}(t)\rightarrow y^{(0)}(t)$ uniformly in $0\leqq t\leqq 1$, and F is bounded over every bounded set $x(\cdot)$ of C if for every positive constant B there exists a constant $K=K_B$ such that $|F[y]|\leqq K$ for all $y(\cdot)$ of C for which $|y(t)|\leqq B$, $0\leqq t\leqq 1$.) Under these conditions on the functional F the authors obtain a transformation formula for Wiener integrals under translations of the form $y(t)=x(t)+x_0(t)$ where $x_0(t)$ is a given function of C with a first derivative $x_0'(t)$ of bounded variation in $0\leqq t\leqq 1$. The transformation formula is $\int_C^w F[y]d_wy=\int_C^w F[x+x_0]\exp\{-\int_0^1[x_0'(t)]^2dt-2\int_0^1x_0'(t)dx(t)\}d_wx$. The formula forms a basis for the calculation of various types of Wiener integrals. (Received July 30, 1943.)

205. M. M. Day: *Uniform convexity.* IV.

In this paper relationships between uniform convexity, factor spaces, and conjugate spaces are discussed. Theorem 1: A normed vector space B is uniformly convex if and only if all the two dimensional factor spaces of B are uniformly convex with a common modulus of convexity. The concept of uniform flattening is suggested by a description of a "sharp edge" on the unit sphere in terms of the norm of the space. It is shown [Theorem 2] that this is dual to uniform convexity; that is, $B[B^*]$ is uniformly flattened if and only if $B^*[B]$ is uniformly convex. It follows that a complete uniformly flattened B is reflexive. The proof of Theorem 2 uses a computation for