

(iii) $\int_0^\omega (1-\lambda/\omega)^k dA(\lambda)$, $\int_0^\omega (1-\lambda/\omega)^k dB(\lambda)$ converge as $\omega \rightarrow \infty$, then $C_k(x, \omega)$ equiconverges with the (C, k) means of the Fourier series of $f(x)$ in $(a+\epsilon, b-\epsilon)$, $\epsilon > 0$. At the same time the allied trigonometrical integral $\bar{C}_k(x, \omega)$ equiconverges with the trigonometrical series allied with the Fourier series of $f(x)$ in the same interval. (B) If $\limsup C_k(x, \omega) < \infty$ for $\omega \rightarrow \infty$ in a set of positive measure, then $C_k(x, \omega)$ and $\bar{C}_k(x, \omega)$ are bounded for almost all x of E as functions of ω and if furthermore (i) and (ii) are satisfied, then the result of the preceding theorem holds good. (C) If $|C_m(x, \omega)| \leq \psi(x) \subset L$ in (a, b) , then the result of the first theorem holds for any $k > m$. (D) If $\int_a^b |C_m(x, \omega)|^p dx < M$, then the result of the first theorem holds for any $k > m + 1/p$. (Received June 23, 1941.)

409. J. W. T. Youngs: *A generalized Lebesgue integral.*

S. Banach has extended the Lebesgue integral to all bounded functions defined on a finite interval (*Théorie des Opérations Linéaires*, Warsaw, 1932). The extended integral enjoys several of the standard properties of the Lebesgue integral, but properties concerned with termwise integrability of a sequence are lacking. It is shown here that if convergence of a sequence of functions is understood to mean convergence in (a general) measure, then the Lemma of Fatou is true; that is, the extended integral is a lower semi-continuous functional on non-negative functions. This fact is used to extend further the integral to unbounded functions. All the properties mentioned above together with the usual theorems on termwise integrability of a sequence hold. Several applications are made. (Received July 24, 1941.)

APPLIED MATHEMATICS

410. E. L. Buell: *On the distribution of plane stress in a semi-infinite plate with partially stiffened edge.* Preliminary report.

The concentration of stress at the straight edge of a thin semi-infinite plate near the point of application of a concentrated shear load acting in the plane of the plate is reduced if the load is applied, not directly to the plate, but to an elastic stiffening rod attached along its edge. When this rod does not extend along the entire edge the boundary value problem of bi-potential theory for the Airy stress function has non-uniform boundary conditions. To solve this problem a conformal mapping of the slit full plane into the interior of the unit circle is employed. A solution of the resulting transformed boundary value problem is obtained in the form of a Fourier series, the coefficients of which satisfy an infinite system of linear equations in an infinite number of unknowns. This system has been solved approximately for the case of a stiffening rod extending to infinity in one direction from the loading point, care being taken to improve the convergence by first separating out the discontinuous parts of the solution. The resultant expressions for those stresses which are of interest have been derived and evaluated numerically. (Received July 28, 1941.)

411. A. S. Householder: *A theory of steady-state activity in nerve-fiber networks. IV: n circuits with a common synapse.*

Let A_i be the product of the activity parameters for the i th circuit (for terminology see Bulletin of Mathematical Biophysics, vol. 3 (1941), pp. 63-69, 105-112). Then an arbitrary stimulus pattern (*SP*) determines uniquely an activity pattern (*AP*) if and only if every A_i , as well as the sum of any number of distinct A_i , is less than unity. In case this condition fails only for the sum of all the A_i , then the possible