($\rho(x)>0$; $-\infty<t\leqq t_0$). The coefficients are continuous and suitably differentiable in $x_1, \cdots, x_m$ for x in a bounded open domain D; they are allowed to become infinite in the neighborhood of the frontier $F(D)$ of D; $F(D)$ may be irregular. (E), (H) are transformed into an integral equation, whose kernel $K(x, z)$ is fundamental for our theory. When $K(x, z)$ is L_2 in a certain one of the variables, while $F(u)$ is self-adjoint, (E), (H) can be effectively studied by methods of spectral theory; when $K(x, z)$ is L_2 in (x, z), Fredholm's theory of integral equations is applicable even when $F(u)$ is not self-adjoint. In the first case it is said the problems are of type (S); in the second—of type (F). Explicit conditions on the coefficients in (E), (H) are found under which the problems are of types (S) or (F). The spectral theory then is developed, yielding various results on existence of solutions, their properties, conditions for their uniqueness, and so on. This work is related to the author's and T. Carleman's earlier works on elliptic partial differential equations. (Received July 8, 1944.)

227. H. S. Wall: *Note on the expansion of a power series into a continued fraction.*

This paper contains an algorithm for expanding a power series into a continued fraction which is based upon the fact that the process for constructing a sequence of orthogonal polynomials can be so arranged that it gives simultaneously a continued fraction expansion for a power series. (Received June 5, 1944.)

228. H. S. Wall: *The convergence of a positive definite J-fraction in the limit-circle case.*

Theorems 4.1, 4.2, 4.3 and 4.4 of the paper *Contributions to the analytic theory of continued fractions and infinite matrices* by E. D. Hellinger and H. S. Wall, Ann. of Math. vol. 44 (1943) pp. 103–127, are extended, with appropriate modifications in the series (4.7), (4.8) and in the polynomials (4.12), to general positive definite J-fractions. Thus, in the limit-circle case, a positive definite J-fraction must either converge over the whole plane to a meromorphic limit-function, or else diverge for every value of the variable. (Received July 13, 1944.)

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229. Nathaniel Coburn: *The Kármán-Tsien pressure-volume relation in the two-dimensional supersonic flow of compressible fluids.*

First, the applicability of the Kármán-Tsien idea in the supersonic range is discussed. Secondly, it is shown that when the Kármán-Tsien relation can be used, the characteristics form a Tschebyscheff net. Further, if the diagonal curves of these characteristics are drawn so as to correspond to equi-intervaled values of the arc length parameter along these characteristics, then these diagonal curves will be the families of equipotentials and stream lines. Analytically, this last result means that the determination of the stream lines depends upon two arbitrary functions of a real variable. The conditions satisfied by these functions are discussed in the case where the given data is of Dirichlet type (two known stream lines as in the jet problem). In particular, if one of the known stream lines coincides with the x-axis, it is shown that only one arbitrary function enters into the problem of determining the stream lines. (Received June 2, 1944.)