ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 5, Number 4, Fall 1975

THE COMPLETE PADÉ TABLES OF CERTAIN SERIES OF SIMPLE FRACTIONS

ALBERT EDREI

Introduction. Let the expansion

$$(1) \qquad \sum_{k=0}^{\infty} a_k z^k = A(z) \qquad (a_0 \neq 0)$$

have a positive radius of convergence and let its analytic continuation define a function $A(z)$, meromorphic in the whole plane. Put

$$(2) \qquad a_{-k} = 0 \qquad (k = 1, 2, 3, \cdots)$$

and associate with every pair (m, n) of ordered, nonnegative integers the polynomial

$$(3) \quad A_{mn}(z) = \begin{vmatrix} 1 & z & z^2 & \cdots & z^n \\ a_{m+1} & a_m & a_{m-1} & \cdots & a_{m-n+1} \\ a_{m+2} & a_{m+1} & a_m & \cdots & a_{m-n+2} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ a_{m+n} & a_{m+n-1} & a_{m+n-2} & \cdots & a_m \end{vmatrix} \quad (A_{m0}(z) \equiv 1),$$

and the Hankel determinant

$$A_m^{(n)} = A_{mn}(0) \qquad (A_m^{(0)} = 1, \ m \geqq 0).$$

In everything that follows $\{m(\lambda)\}_{\lambda=1}^{\infty}$, $\{n(\lambda)\}_{\lambda=1}^{\infty}$ denote two sequences of nonnegative integers such that

$$(4) \qquad A_m^{(n)} \neq 0 \qquad (m = m(\lambda), n = n(\lambda); \lambda = 1, 2, 3, \cdots),$$

and we usually require

$$(5) \qquad m(\lambda) \to \infty, \ n(\lambda) \to \infty \qquad (\lambda \to \infty).$$

We say that

$$(6) \qquad Q_{mn}(z) = \frac{A_{mn}(z)}{A_m^{(n)}} \qquad (m = m(\lambda), \ n = n(\lambda))$$

The research of the author was supported by a grant from the National Science Foundation GP-33175.