RESEARCH ANNOUNCEMENTS

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FUNCTIONAL INDEPENDENCE OF THETA CONSTANTS

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Communicated by Murray Gerstenhaber, January 20, 1968

1. Introduction and main theorems. If

$$\begin{bmatrix} \epsilon \\ \epsilon' \end{bmatrix} = \begin{bmatrix} \epsilon_1 & \cdots & \epsilon_g \\ \epsilon_1' & \cdots & \epsilon_g' \end{bmatrix}$$

is an even theta g-characteristic ($g \geqq 1$ for this definition but $g \geqq 2$ elsewhere in this note), i.e., a $2 \times g$ matrix with 0, 1 entries, for which $\epsilon \cdot \epsilon' \equiv 0(2)$ (dot is inner product of row g-vectors), and A is a symmetric $g \times g$ complex matrix with positive definite imaginary part, i.e., an element of the Siegel upper half plane $\mathfrak{S}_g$, then the corresponding theta constant is defined by

$$(1)\quad \theta\begin{bmatrix} \epsilon \\ \epsilon' \end{bmatrix} = \sum_n \exp \pi i \{ (n + \epsilon/2) A \cdot (n + \epsilon/2) + 2(n + \epsilon/2) \cdot (\epsilon'/2) \},$$

where the sum is over all integral row g-vectors n. There are $2^{g-1}(2^g+1)$ theta constants (explicit dependence on A is suppressed in the notation). These are the "zero values of the first order even theta functions with half-integer characteristics."

It is implicitly assumed, it seems to me, in the literature that the Jacobian of the $2^{g-1}(2^g+1)$ theta constants with respect to the $g(g+1)/2$ independent elements a_{ij}, $i \leqq j$, $i, j = 1, \cdots, g$ of A is generically of maximal rank $g(g+1)/2$ on $\mathfrak{S}_g$, but I have not seen a proof. I present here the sharper, i.e., explicit

[1] Research partially sponsored by the Air Force Office of Scientific Research, Office of Aerospace Research, U. S. Air Force, under AFOSR Grant No. AF-AFOSR-1077-66.