132. *On Infinitesimal Affine Automorphisms of Siegel Domains*

By Masaru TAKEUCHI
Osaka University

(Comm. by Kunihiko KODAIRA, M. J. A., Sept. 12, 1969)

A non-empty open cone V in a finite dimensional vector space X over $\boldsymbol{R}$ is called a *convex cone*, if it is convex and contains no straight lines. For example, the cone $\mathcal{P}(m, \boldsymbol{R})$ ($\mathcal{P}(m, \boldsymbol{C})$) of all positive-definite real symmetric (complex hermitian) matrices of degree m is a convex cone. For a convex cone V in X, an $\boldsymbol{R}$-bilinear map F on a finite dimensional vector space Y over $\boldsymbol{C}$ into the complexification X^C of X is called a *V-hermitian function* if it is $\boldsymbol{C}$-linear with respect to the first variable and $F(u, v)=\overline{F(v, u)}$, where $z\mapsto\bar{z}$ is the conjugation of X^C with respect to the real form X, and if it is V-positive-definite in the sense that $F(u, u)\in\bar{V}$ (the closure of V in X) and $F(u, u)=0$ implies $u=0$ for $u\in Y$. For a V-hermitian function F, the domain $D(V, F)$ $=\{(z, u)\in X^C\times Y\,;\,\mathcal{I}_m z-F(u, u)\in V\}$ of $X^C\times Y$ is called a *Siegel domain* associated to V and F. A Siegel domain $D(V, F)$ in $X^C\times Y$ is called *irreducible* if Y is not the direct sum of two non-trivial subspaces which are mutually orthogonal with respect to F. For Siegel domains $D(V, F)\subset X^C\times Y$ and $D(V', F')\subset X'^C\times Y'$, an affine isomorphism φ of $X^C\times Y$ onto $X'^C\times Y'$ is called an *affine isomorphism* of $D(V, F)$ onto $D(V', F')$ if $\varphi(D(V, F))=D(V', F')$. An affine isomorphism of a Siegel domain $D(V, F)$ onto itself is called an *affine automorphism* of $D(V, F)$. If the group of affine automorphisms of a Siegel domain is transitive on it the domain is said to be *homogeneous*.

In this note we shall state a theorem which reduces the classification of homogeneous Siegel domains with respect to affine isomorphism to the one of certain distributive algebras over $\boldsymbol{R}$ and we shall describe the structure of the Lie algebra of the group of affine automorphisms of a homogeneous Siegel domain in terms of the above algebra.

A finite dimensional distributive algebra $\mathfrak{C}$ over $\boldsymbol{R}$ is called a *matrix algebra with involution* * of rank $m+1$ if : 1) it is bigraded: $\mathfrak{C}=\sum_{1\leq i,k\leq m+1}\mathfrak{C}_{ik}$, 2) $\mathfrak{C}_{ik}\mathfrak{C}_{kl}\subset\mathfrak{C}_{il}$, $\mathfrak{C}_{ik}\mathfrak{C}_{pq}=\{0\}$ if $k\neq p$, 3) $a\mapsto a^*$ is an involutive anti-automorphism of the algebra $\mathfrak{C}$, $\mathfrak{C}_{ik}^*=\mathfrak{C}_{ki}$, 4) if we put $n_{ik}=\dim\mathfrak{C}_{ik}$, we have $n_{ii}\neq 0$ for $1\leq i\leq m+1$. Henceforce, a_{ik}, b_{ik}, $\cdots$ will always denote arbitrary elements of the subspace $\mathfrak{C}_{ik}$. A matrix