H. Kaneta
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THE INVARIANT POLYNOMIAL ALGEBRAS FOR THE GROUPS $ISL(n)$ AND $ISp(n)$

HITOSHI KANETA

§ 0. Main theorems

This paper is a continuation to the previous one [3]. We shall show that, for the inhomogeneous linear group $ISL(n+1, \boldsymbol{R})$ (resp. $ISp(n, \boldsymbol{R})$), the coadjoint invariant polynomial algebra is generated by one (resp. n) algebraically independent element. We shall state our results more precisely.

(i) $ISL(n+1, \boldsymbol{R})$, $(n \geqq 1)$.

We can consider the following vector space $\mathfrak{H}_n$ to be a subspace of the dual space realized as in Section 1 of the Lie algebra of $ISL(n+1, \boldsymbol{R})$;

$$\mathfrak{H}_n = \left\{ \begin{pmatrix} 0 & & & 0 & 0 \\ & \ddots & 0 & \vdots & \vdots \\ y_{21} & \ddots & & \vdots & \vdots \\ 0 & \ddots & \ddots & \vdots & 0 \\ & & y_{n+1,n} & 0 & y_{n+1} \end{pmatrix} \right\}.$$

Let $t = \left(\prod_{k=1}^{n} y_{k+1,k}^{k}\right) y_{n+1}^{n+1}$ be a polynomial function on $\mathfrak{H}_n$. Denote by $\mathscr{I}_n$ the $\boldsymbol{C}$-algebra of the coadjoint invariant polynomial functions on the dual space of the Lie algebra of $ISL(n+1, \boldsymbol{R})$.

THEOREM 1. *The restriction map of $\mathscr{I}_n$ into the set of polynomials on $\mathfrak{H}_n$ is an injective algebra-homomorphism, whose image is $\boldsymbol{C}[t]$.*

(ii) $ISp(n, \boldsymbol{R})$ $(n \geqq 1)$.

In this case we can consider the following vector space $\mathfrak{H}_n$ to be a subspace of the dual space realized as in Section 2 of the Lie algebra of $ISp(n, \boldsymbol{R})$;

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