J. Math. Kyoto Univ. (JMKYAZ)
13-1 (1973) 191-201

# On a canonical operation of sl(2m) on the exterior algebra of the vector space of complex m×n-matrices

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(Communicated by Professor Nagata, September 1, 1972)

**1.** We mean by $Z_{ip}$ $(1\leq i\leq m,\ 1\leq p\leq n)$ independent complex variables and denote by $E$ the exterior algebra generated by $dZ_{ip}$, $d\bar{Z}_{jq}$ $(1\leq i, j\leq m;\ 1\leq p, q\leq n)$. For brevity we put

$$\theta_{ip}=dZ_{ip},\ \bar{\theta}_{jq}=d\bar{Z}_{jq}\ \ (1\leq i, j\leq m;\ 1\leq p, q\leq n).$$

Operators $L_{ij}$, $\Lambda_{ij}$ acting on $E$ are defined by

$$L_{ij}=\sqrt{-1}\sum_{p=1}^{n}e(\theta_{ip})e(\bar{\theta}_{jp}),$$

$$\Lambda_{ij}=-\sqrt{-1}\sum_{p=1}^{n}i(\theta_{ip})i(\bar{\theta}_{jp})$$

where $e(\xi)\eta=\xi\wedge\eta$ and $i(\xi)\eta$ is the inner product of $\xi$ with $\eta$ with respect to the metric

$$2\sum_{i=1}^{m}\sum_{p=1}^{n}(dZ_{ip}, d\bar{Z}_{ip}).$$

In the present note we shall show that there exists a representation $\rho$ of Lie algebra $sl(2m)$ on $E$ such that

$$\rho\left(\begin{array}{c|c} 0 & (a_{ij}) \\ \hline 0 & 0 \end{array}\right)=\sum_{i,j=1}^{m}(-1)^{j+1}a_{ij}L_{ij},$$

$$\rho\left(\begin{array}{c|c} 0 & 0 \\ \hline (b_{ij}) & 0 \end{array}\right)=\sum_{i,j=1}^{m}(-1)^{j+1}b_{ji}\Lambda_{ij}.$$