

Matrix operators on symmetric Kähler domains.

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Abstract

Let D be the Kähler manifold of $n \times n$ symmetric matrices Z such that $I - \bar{Z}Z > 0$ and the holomorphic representation $T_g F(z) = k'_g(Z)^\gamma F(k_g(z))$ of the group $G = Sp(2n)$. A suitable basis of the real vector space \mathcal{G} , the Lie algebra of G , can be chosen such that the infinitesimal holomorphic representation relatively to this basis is given by the Hua matrix operators

$$\begin{aligned} \mathcal{V}_t &= (Z\partial_Z - \partial_Z Z) + i(Z\partial_Z + \partial_Z Z) & (i) \\ \mathcal{V}_p &= (\partial_Z - Z\partial_Z Z) + i(\partial_Z + Z\partial_Z Z) & (ii) \end{aligned} \quad \text{where } \partial_Z = \frac{1}{2}((1 + \delta_{ij})\frac{\partial}{\partial z_{ij}})$$

Traces in the matrix products $\mathcal{V}_t \bar{\mathcal{V}}_t$ and $\mathcal{V}_p \bar{\mathcal{V}}_p$ give the Laplace-Beltrami and Ornstein-Uhlenbeck operators on D . Similar results stay valid for Kähler submanifolds \mathcal{M} of D when the coefficients of the matrix Z depends linearly on p independent coefficients with $p < n(n+1)/2$. We determine the invariant measures for the Laplacian and Ornstein-Uhlenbeck operators on \mathcal{M} .

- [1] Airault, Hélène; Boussejra, Abdelhamid, Lifted infinitesimal holomorphic representation for the n -dimensional complex hyperbolic ball and for Cartan domains of type I. Bull. Sci. Math. 137 (2013), no. 7, 923 -967.
- [2] Airault, Hélène; Boussejra, Abdelhamid, Preprint (Novembre 2017).