THE EXPLICIT SOLUTION OF THE $\bar{\partial}$-NEUMANN PROBLEM IN A NON-ISOTROPIC SIEGEL DOMAIN

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ABSTRACT. In this paper, we solve the $\bar{\partial}$-Neumann problem on $(0, q)$ forms, $0 \leq q \leq n$, in the strictly pseudoconvex non-isotropic Siegel domain:

$$
\mathbb{D}^n = \left\{ (z, z_{n+1}) : z = (z_1, \ldots, z_n) \in \mathbb{C}^n, \quad \text{Im}(z_{n+1}) > \sum_{j=1}^{n} a_j |z_j|^2 \right\},
$$

where $a_j > 0$ for $j = 1, 2, \ldots, n$. The metric we use is invariant under the action of the Heisenberg group on the domain. The fundamental solution of the related differential equation is derived via the Laguerre calculus. We obtain an explicit formula for the kernel of the Neumann operator. We also construct the solution of the corresponding heat equation and the fundamental solution of the Laplacian operator on the Heisenberg group.