Abstract for

"The Cauchy-Szegö projection on a family of model domains $\Omega_{\vec{k}}$ in $\mathbf{C}^{n+1}$"

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In this talk, we give a brief introduction of some progress of analysis, especially on SzegÓ projection on a family of model domains $\Omega_{\vec{k}}$ in $\mathbf{C}^{n+1}$. Here

$$\Omega_{\vec{k}} = \left\{ (z_1, \ldots, z_n, z_{n+1}) \in \mathbf{C}^{n+1} : \operatorname{Im}(z_{n+1}) > \sum_{k=1}^{n} \frac{1}{2k_j} |z_k|^{2k_j}, \;\; k_j \in \mathbf{N} \right\}$$

Here $\vec{k} = (k_1, \ldots, k_n)$ with $k_j \in \mathbf{N}$. These are decouple domains of finite type. The goal of this talk is to discuss the L^p, $1 < p \leq \infty$ properties of the Cauchy-Szegö projection defined on $\partial\Omega_{\vec{k}}$. We first give a quick review for the case $n = 0$ and then move to cases $n \geq 1$. We begin with the case when $k_j = 1$ for all k_j (which is the unbounded realization of the unit ball in $\mathbf{C}^{n+1}$). Then we move to cases for $k_j > 1$. In general, $\Omega_{\vec{k}}$ is not a group (except $k_j = 1$ for all j). We try to explain an optimal "lifting" argument to lift $\partial\Omega_{\vec{k}}$ to a high dimensional hypersurface so that it can be identified as a nilpotent Lie group structure. Once we achieve this goal, we may give precise characterization of atomic Hardy spaces for $0 < p \leq 1$ and obtain H^p estimates.