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Boundary regularity of the $\overline{\partial}$ operator in the complex projective space and applications

Let Ω be a pseudoconvex domain with smooth boundary in a Hermitian manifold and $g \in C^{\infty}_{(p,q)}\left(\overline{\Omega}\right)$ a $\overline{\partial}$-closed form, $q > 0$. Under the hypothesis that there exists a strongly plurisubharmonic function in a neighborhood of $\partial\Omega$, by a classical theorem of J. J. Kohn there exists $f \in C^{\infty}_{(p,q-1)}\left(\overline{\Omega}\right)$ such that $\overline{\partial}f = g$. For pseudoconvex domains in the complex projective space the existence of a plurisubharmonic function in a neighborhood of $\partial\Omega$ is not true in general.

In this talk, we will discuss the boundary regularity of $\overline{\partial}$ on pseudoconcave domains in the complex projective space and its applications to a quantitative version of Martineau-Serre duality for the Bergmann space and to the non-existence of Levi-flat hypersurfaces.