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A MAPPING PROPERTY OF THE BERGMAN PROJECTION ON CERTAIN PSEUDOCONVEX DOMAINS

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Abstract. We show that the Bergman kernel function, associated to pseudoconvex domains of finite type with the property that the Levi form of the boundary has at most one degenerate eigenvalue, is a standard kernel of Calderón-Zygmund type with respect to the Lebesgue measure. As an application, we show that the Bergman projection on these domains preserves some of the Lebesgue classes.

1. Introduction. Let $\Omega \subset C^n$ be a bounded domain. The Bergman projection P on Ω is the orthogonal projection.

$$P: L^2(\Omega) \longrightarrow H(\Omega) \cap L^2(\Omega) = A^2(\Omega),$$

where $H(\Omega)$ denotes the set of holomorphic functions on Ω. There is a corresponding kernel function $K_\Omega(z, w)$, the Bergman kernel function, such that

$$Pf(z) = \int_\Omega K_\Omega(z, w) f(w) dw .$$

Let a triple (S, d, μ) be a space of homogeneous type, that is, S is a set, d is a pseudometric on S and μ is a positive measure on S; more precisely, $d: S \times S \to [0, \infty)$ satisfies

(a) $d(x, y) = 0 \Leftrightarrow x = y$,

(b) $C_1^{-1} d(y, x) \le d(x, y) \le C_1 d(y, x)$,

(c) $d(x, y) \le C_2(d(x, z) + d(z, y))$ for $x, y, z \in S$,

for independent constants C_1, C_2; and for all $x \in S$ and small $\delta > 0$, there is an independent constant C_3 such that

(i) $\mu(P(x, \delta)) < \infty$;

(ii) $\mu(P(x, 2\delta)) \le C_3 \mu(P(x, \delta))$,

where

$$P(x, \delta) = \{ y \in S : d(x, y) < \delta \} .$$

DEFINITION 1.1. A kernel $K: S \times S - \{x = y\} \to C$ is called a standard kernel if

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