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J. Abardia

Dep. de Matemàtiques, Facultat de Ciències, Universitat Autònoma, 08193–Bellaterra /
Barcelona, Spain
juditab@mat.uab.cat

E. Gallego

Dep. de Matemàtiques, Facultat de Ciències, Universitat Autònoma, 08193–Bellaterra /
Barcelona, Spain
egallego@mat.uab.cat

Convexity on Complex Hyperbolic Space

In a Riemannian manifold a regular convex domain is said to be λ -convex if its normal curvature at each point is greater than or equal to $\lambda > 0$. In a Hadamard manifold, the asymptotic behaviour of the quotient $\text{vol}(\Omega_t)/\text{vol}(\partial\Omega_t)$ for a family of λ -convex domains Ω_t expanding over the whole space has been studied and general bounds for this quotient are known.

In this paper we improve this general result in the complex hyperbolic space $\mathbb{C}H^n(-4k^2)$, a Hadamard manifold with constant holomorphic curvature equal to $-4k^2$. Furthermore, we give some specific properties of convex domains in $\mathbb{C}H^n(-4k^2)$ and we prove that λ -convex domains of arbitrary diameter exists if $\lambda \leq k$.

Keywords: Complex hyperbolic space, convex domain, volume, area.

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