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A NOTE ON REAL HYPERSURFACES OF A COMPLEX HYPERBOLIC SPACE

By

He-Jin KIM

Introduction.

A Kaehlerian manifold of constant holomorphic sectional curvature c is called a complex space form. The complete and simply connected complex space form of complex dimension n consists of a complex projective space P^nC, a complex Euclidean space C^n or a complex hyperbolic space H^nC, according as $c>0$, $c=0$ or $c<0$.

Many subjects for real hypersurfaces of a complex projective space P^nC have been studied [1], [4], [5] and [6]. One of which, done by Kimura [6], asserts the following interesting result.

THEOREM K. *There are no real hypersurfaces of P^nC with parallel Ricci tensor on which $J\xi$ is principal, where ξ denotes the unit normal and J is the complex structure of P^nC.*

A Riemannian curvature of a Riemannian manifold M is said to be *harmonic* if the Ricci tensor S satisfies the Codazzi equation, that is,

$$\nabla_X S(Y, Z)-\nabla_Y S(X, Z)=0 \tag{0.1}$$

for any tangent vector fields X, Y and Z, where ∇ denotes the Riemannian connection of M. This condition is essentially weaker than that of the parallel Ricci tensor [2]. From this point of view, Kwon and Nakagawa [5] extends recently the following:

THEOREM K-N. *There are no real hypersurfaces with harmonic curvature of P^nC on which $J\xi$ is principal.*

Now we are interested in these problems in the case of $c<0$, that is, the ambient space is a complex hyperbolic space H^nC. Montiel [7] stated that there are no Einstein real hypersurfaces in H^nC, and classified the pseudo-Einstein real hypersurfaces of H^nC. In this paper, we will prove

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