TSUKUBA J. MATH.
Vol. 18 No. 2 (1994), 483—492

ON REAL HYPERSURFACES OF TYPE A IN A COMPLEX SPACE FORM (I)

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§1. Introduction.

A complex n-dimensional Kähler manifold of constant holomorphic sectional curvature c is called a *complex space form*, which is denoted by $M_n(c)$. A complete and simply connected complex space form 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 $c<0$.

Now, let M be a real hypersurface of an n-dimensional complex space form $M_n(c)$. Then M has an almost contact metric structure (ϕ, ξ, η, g) induced from the Kähler metric and the almost complex structure of $M_n(c)$. Okumura [7] and Montiel and Romero [6] proved the following

THEOREM A. *Let M be a real hypersurface of P_nC, $n\geqq 2$. If it satisfies*

$$A\phi-\phi A=0, \tag{1.1}$$

then M is locally a tube of radius r over one of the following Kähler submanifolds:

(A_1) *a hyperplane $P_{n-1}C$, where $0<r<\pi/2$,*

(A_2) *a totally geodesic P_kC $(1\leqq k\leqq n-2)$, where $0<r<\pi/2$,*

where A is the shape operator in the direction of the unit normal C on M.

THEOREM B. *Let M be a real hypersurface of H_nC, $n\geqq 2$. If it satisfies (1.1), then M is locally one of the following hypersurfaces:*

(A_0) *a horosphere in H_nC, i.e., a Montiel tube,*

(A_1) *a tube of a totally geodesic hyperplane $H_{n-1}C$,*

(A_2) *a tube of a totally geodesic H_kC $(1\leqq k\leqq n-2)$.*

On the other hand, the following theorem is proved by Maeda and Udagawa [4] under that the structure vector ξ is principal and then recently by Kimura

This research was partially supported by KOSEF (1992-1993).
Received February 1, 1993, revised March 15, 1993.