TSUKUBA J. MATH.
Vol. 19 No. 1 (1995), 163–172

CHARACTERIZATIONS OF REAL HYPERSURFACES IN COMPLEX SPACE FORMS IN TERMS OF CURVATURE TENSORS

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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 $c<0$.

In this study of real hypersurfaces of P_nC, Takagi [8] classified all homogeneous real hypersurfaces and Cecil and Ryan [2] showed also that they are realized as the tubes of constant radius over Kähler submanifolds if the structure vector field ξ is principal. And Berndt [1] classified all homogeneous real hypersurfaces of H_nC and showed that they are realized as the tubes of constant radius over certain submanifolds. According to Takagi's classification theorem and Berndt's one, the principal curvatures and their multiplicities of homogeneous real hypersurfaces of $M_n(c)$ are given.

Now, let M be a real hypersurface of $M_n(c)$, $c\neq 0$. Then M has an almost contact metric structure (ϕ, ξ, η, g) induced from the Kähler metric and the almost complex structure of $M_n(c)$. We denote by A the shape operator in the direction of the unit normal on M. Then 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 $0<r<\pi/2$,*

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* Partially supported by KOSEF.
** Partially supported by TGRC-KOSEF and BSRI 94-1404.
Received May 11, 1993.