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CYCLIC-PARALLEL REAL HYPERSURFACES OF A COMPLEX SPACE FORM

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Introduction.

In 1973 Takagi [14] classified homogeneous hypersurfaces of a complex projective space P_nC by proving that all of them could be divided into six types, and he [15], [16] showed also that if a real hypersurface M has two or three distinct constant principal curvatures, then M is congruent to one of the homogeneous hypersurfaces of type A_1, A_2 and B among these ones. This result is generalized by Kimura [6], who gives the complete classification that a real hypersurface M of P_nC has constant principal curvatures and FC is principal if and only if M is congruent to one of homogeneous examples, where C denotes the unit normal and F is the almost complex structure. The study of real hypersurfaces of type A_1, A_2 and B of P_nC was originated by Cecil and Ryan [1], Kimura [7], Kon [8], Maeda [10], Okumura [13] and so on.

Real hypersurfaces with cyclic-parallel Ricci tensor of a complex space form $M^n(c)$ have recently been classified by Kwon and Nakagawa [9] in the case where FC is principal. They also gave another characterization of real hypersurfaces of type A_1 and A_2 of P_nC.

On the other hand, many subjects for real hypersurfaces of a complex hyperbolic space H_nC were investigated from different points of view ([2], [3], [11], [12] etc.) one of which, done by Chen, Ludden and Montiel [3], asserts that a real hypersurface M of H_nC is of cyclic-parallel if and only if the structure tensor J induced on M and the shape operator A derived from the unit normal commute each other, that is, $JA=AJ$. In particular, real hypersurfaces of H_nC, which are said to be of type A, similar to those of type A_1 and A_2 of P_nC, were treated by Montiel and Romero [12].

The purpose of the present paper is to show that a real hypersurface of a complex space form $M^n(c)$, $c\neq 0$, is of cyclic-parallel if and only if $JA=AJ$, and to give a complete classification of such hypersurfaces by using those examples constructed in [9], [12] and [15].

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