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NON-NEGATIVELY CURVED C-TOTALLY REAL SUBMANIFOLDS IN A SASAKIAN MANIFORD

By

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Dedicated to Professor Y. Tashiro on his 60th birthday

§ 0. Introduction.

Several authors have investigated minimal totally real submanifolds in a complex space form and obtained many interesting results. Recently F. Urbano [6] and Y. Ohnita [4] have studied pinching problems on their curvatures and stated some theorems.

On the other hand, in a $(2n+1)$-dimensional Sasakian space form of constant ϕ-sectional curvature $c(>-3)$, if a submanifold M is perpendicular to the structure vector field, then M is said to be *C-totally real*. For such a submanifold M, it is well-known that if the mean curvature vector field of M is parallel, then M is minimal. S. Yamaguchi, M. Kon and T. Ikawa [8] obtained that if the squared length of the second fundamental form of M is less than $n(n+1)(c+3)/4(2n-1)$, then M is totally geodesic. Furthermore, D. E. Blair and K. Ogiue [2] proved that if the sectional curvature of M is a greater than $(n-2)(c+3)/4(2n-1)$, then M is totally geodesic.

In this paper, we consider a curvature-invariant C-totally real submanifold M in a Sasakian manifold with η-parallel mean curvature vector field. Then M is not necessary minimal. Making use of methods of [3] and [4], we prove that if the sectional curvature of M is positive, then M is totally geodesic.

In Sec. 1, we recall the differential operators on the unit sphere bundle of a Riemannian manifold. Sec. 2 is devoted to stating about fundamental formulas on a C-totally real submanifold in a Sasakian manifold. In Sec. 3, we prove Theorems and Corollaries. Throughout this paper all manifolds are always C^∞, oriented, connected and complete. The author wishes to thank Professor S. Yamaguchi for his help.

§ 1. A differential operator defined by A. Gray.

Let M be an n-dimensional Riemannian manifold and $\Gamma(M)$ the Lie algebra

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