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LOCAL RIGIDITY THEOREMS OF 2-TYPE HYPERSURFACES IN A HYPERSPHERE

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Dedicated to Professor Tadashi Nagano on his 60th birthday

1. Introduction

A submanifold M (connected but not necessary compact) of a Euclidean m-space E^m is said to be *of finite type* if each component of its position vector X can be written as a finite sum of eigenfunctions of the Laplacian Δ of M, that is,

$$X = X_0 + \sum_{t=1}^{k} X_t$$

where X_0 is a constant vector and $\Delta X_t = \lambda_t X_t$, $t = 1, 2, \cdots, k$. If in particular all eigenvalues $\{\lambda_1, \lambda_2, \cdots, \lambda_k\}$ are mutually different, then M is said to be *of k-type* (cf. [3] for details).

In terms of finite type submanifolds, a well-known result of T. Takahashi [10] says that a submanifold M is S^m is of 1-type if and only if M is a minimal submanifold of S^m. The theory of minimal submanifolds has attracted many mathematicians for many years. Many interesting results concerning minimal submanifolds have been obtained. For instances, T. Otsuki investigated in [7, 8] minimal (i.e., 1-type) hypersurfaces M of a hypersphere S^{n+1} of a Euclidean $(n+2)$-space E^{n+2} such that M has exactly two distinct principal curvatures. Some interesting local classification theorems were obtained by him (cf. [7, 8]). On the other hand, the problem of classification of 2-type hypersurfaces of S^{n+1} was initiated in [3]. Several results in this respect were obtained in [1, 3, 4, 5, 6].

In this paper we consider the classification problem similar to Otsuki's for 2-type hypersurfaces in S^{n+1}. As a consequence the following two local rigidity theorems are obtained.

THEOREM 1. *Let M be a hypersurface of the hypersphere $S^{n+1}(1)$ in*

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