

SOME ESTIMATES FOR THE CURVATURES OF SPACELIKE HYPERSURFACES IN DE SITTER SPACE

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Abstract. In this paper we will report on our recent studies on curvature properties of space-like hypersurfaces in de Sitter space. In particular, we will state certain estimates for the higher order mean curvatures, the scalar curvature and the Ricci curvature of complete space-like hypersurfaces in de Sitter space. We will also establish a sufficient condition for a compact space-like hypersurface in de Sitter space to be spherical in terms of a lower bound for the square of its mean curvature.

1. Introduction and Statement of the Main Results

The study of space-like hypersurfaces in de Sitter space \mathbb{S}_1^{n+1} has been of increasing interest in the last years, because of their nice Bernstein-type properties. Since Goddard [7] conjectured in 1977 that the only complete space-like hypersurfaces in \mathbb{S}_1^{n+1} with constant mean curvature H should be the totally umbilical ones (which is clearly false), many authors have worked on the problem of finding global rigidity theorems for space-like hypersurfaces in de Sitter space [1, 5, 10, 12, 14, 17, 18].

In this paper we will report on our recent studies on curvature properties of space-like hypersurfaces in de Sitter space. By curvatures here we mean the higher order mean curvatures of the hypersurface, as well as its scalar and Ricci curvatures. For further details we refer the reader to the original papers [2] and [3]. In particular, for the case of complete space-like hypersurfaces we have obtained the following (Theorem 1 in [2]).