

On the umbilicity of complete constant mean curvature spacelike hypersurfaces

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Resumo

The last few decades have seen a steadily growing interest in the study of the geometry of spacelike hypersurfaces immersed in a Lorentz space form. Apart from physical motivations, from the mathematical point of view this is mostly due to the fact that such hypersurfaces exhibit nice Bernstein-type properties, and one can truly say that the first remarkable results in this branch were the rigidity theorems of E. Calabi and S.Y. Cheng and S.T. Yau for hypersurfaces in the Lorentz space. In the case of the de Sitter space, A.J. Goddard conjectured that every complete spacelike hypersurface with constant mean curvature in such ambient space should be totally umbilical. Although the conjecture turned out to be false in its original statement, it motivated a great deal of work of several authors trying to find a positive answer to the conjecture under appropriate additional hypotheses. In this work, we show that a complete spacelike hypersurface immersed with constant mean curvature in the de Sitter space must be totally umbilical, provided that its Gauss mapping has some suitable behavior. In particular, we use an extension of Hopf's maximum principle due to S.T. Yau in order to give new positive answers for the Goddard's conjecture. This is a joint work with Henrique Fernandes de Lima(UFCG).