

On biharmonic hypersurfaces of three curvatures in Minkowski 5-space

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Abstract

In this paper, we study the L_k -biharmonic Lorentzian hypersurfaces of the Minkowski 5-space \mathcal{M}^5 , whose second fundamental form has three distinct eigenvalues. An isometrically immersed Lorentzian hypersurface, $\mathbf{x} : M_1^4 \rightarrow \mathcal{M}^5$, is said to be L_k -biharmonic if it satisfies the condition $L_k^2 \mathbf{x} = 0$, where L_k is the linearized operator associated to the 1st variation of the mean curvature vector field of order $(k+1)$ on M_1^4 . In the special case $k=0$, we have L_0 is the well-known Laplace operator Δ and by a famous conjecture due to Bang-Yen Chen each Δ -biharmonic submanifold of every Euclidean space is minimal. The conjecture has been affirmed in many Riemannian cases. We obtain similar results confirming the L_k -conjecture on Lorentzian hypersurfaces in \mathcal{M}^5 with at least three principal curvatures.

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