

1070-51-210

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The projective or split-quaternionic models are used to obtain informations of the geometry of Lorentzian surfaces or hypersurfaces in certain ambient spaces. For instance, using the projective model we consider conformally flat Lorentzian hypersurfaces in the conformal compactification of \mathbb{R}_1^{n+1} , the projectivized light cone $\widehat{\mathbb{R}}_1^{n+1} \subset \mathbb{R}P^{n+2}$ induced from \mathbb{R}_2^{n+3} . For this case, we give a Lorentz version of the classification theorem of Cartan, in terms of branched channel hypersurfaces for $n \geq 4$, and for $n = 3$, in terms the conformal fundamental forms were closed. For hypersurfaces whose shape operator has complex eigenvalues, we give a necessary condition to be conformally flat in terms of local integrability of distributions. (Received February 12, 2011)