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ON MANNHEIM PARTNER CURVES IN DUAL LORENTZIAN SPACE

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Abstract

In this paper we define non-null Mannheim partner curves in three dimensional dual Lorentzian space $\mathbb{D}_1^3$, and obtain necessary and sufficient conditions for the existence of non-null Mannheim partner curves in dual Lorentzian space $\mathbb{D}_1^3$.

Keywords: Mannheim partner curve, Dual Lorentzian space, Dual Lorentzian space curve.

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1. Introduction

In the differential geometry of a regular curve in Euclidean 3-space $\mathbb{E}^3$, it is well known that one of the important problems is the characterization of a regular curve. The curvature functions k_1 (curvature $\varkappa$) and k_2 (torsion τ) of a regular curve play an important role in determining the shape and size of the curve [4, 8]. For example: If $k_1 = k_2 = 0$, then the curve is a geodesic. If $k_1 \neq 0$ (constant) $k_2 = 0$, then the curve is a circle with radius $1/k_1$. If $k_1 \neq 0$ (constant) and $k_2 \neq 0$ (constant), then the curve is a helix in the space, etc.

Another route to the classification and characterization of curves is the relationship between the Frenet vectors of the curves. For example Saint Venant, in 1845, proposed the question whether upon the surface generated by the principal normal of a curve, a second curve can exist which has for its principal normal the principal normal of the given curve. This question was answered by Bertrand in 1850, when he showed that a necessary and sufficient condition for the existence of such a second curve is that a linear

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