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III Laplace-Beltrami and (S,L)-type Rotational Surface

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Abstract

We study on the third Laplace-Beltrami operator of timelike rotational surface of (S,L)-type in three dimensional Minkowski space.

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1 Introduction

Rotational surfaces in Euclidean 3-space $\mathbb{E}^3$ have been studied since long time, and nice examples of such surfaces have been obtained [3]. On the other side, Minkowski 3-space $\mathbb{E}_1^3$ has more complicated geometric structures compared to $\mathbb{E}^3$. In particular, $\mathbb{E}_1^3$ has distinguished axes of rotation, namely, *spacelike*, *timelike* and *lightlike axes*. About the semi-Riemannian geometry, many nice books have been done such as [4].

A helicoidal surface and a rotational surface with lightlike profile curve have an isometric relation by Bour's theorem is shown by Güler [1] in $\mathbb{E}_1^3$. He also classified the spacelike (and timelike) helicoidal (and rotational) surfaces with lightlike profile curve of spacelike, timelike and lightlike axes.