

# Geometrical properties of surfaces endowed with a canonical principal direction in 3-dimensional Minkowski space

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## Abstract

Given a vector field  $X$  in a Riemannian manifold  $N$ , a hypersurface  $M$  of  $N$  is said to be endowed with a canonical principal direction relative to  $X$  if the projection of  $X$  onto the tangent bundle of  $M$  gives a principal direction, [4].

It turns out that when  $N$  is a product space  $\tilde{N} \times \mathbb{R}$  some interesting geometrical properties of hypersurfaces endowed with a canonical principal direction relative to  $X$  occur if  $X$  is chosen to be the unit vector field tangent to the second factor (See for example [1, 2, 3, 6, 8]). On the other hand, some particular cases of this problem were studied in [5, 7], where the ambient space  $N$  is (pseudo-)Euclidean and  $X$  is a fixed direction.

In this talk, we will focus on surfaces in Minkowski 3-space  $\mathbb{E}_1^3$  after we will present a survey of recent results on surfaces having a canonical principal direction relative to  $X$ . In particular, we present some new classification results of these surfaces in  $\mathbb{E}_1^3$  when  $X$  is chosen to be a fixed direction.

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