Constant Contact Angle Surfaces in the Lorentz Group L^3

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Abstract

Surfaces making constant angles with certain directions are interesting and they are intensively studied by several authors in different ambient spaces. An interesting characterization of constant angle surfaces in Minkowski space is given by Lopez and Munteanu, in [3]. Also, in [1] and [2], Dillen and others have studied constant angle surfaces in product spaces $S^2 \times \mathbb{R}$ and $H^2 \times \mathbb{R}$, namely those surfaces for which the unit normal makes a constant angle with the tangent direction to $\mathbb{R}$. Recently, Munteanu, Fastenakels and van der Veken, in [5], extended the notion of constant angle surfaces in $S^2 \times \mathbb{R}$ and $H^2 \times \mathbb{R}$ to general $Bianchi - Cartan - Vranceanu$ spaces and they showed that these surfaces have constant Gaussian curvature, also they gave a complete local classification in the Heisenberg group.
In [4] we introduced the notion of contact angle, which can be considered as a new geometric invariant useful for investigating the geometry of immersed surfaces in S^3. Also in [4], we derived formulae for the Gaussian curvature and for the Laplacian equation of an immersed minimal surface in S^3, and we gave a characterization of the Clifford Torus as the only minimal surface in S^3 with constant contact angle. Besides, interesting characterizations of the Clifford torus in spheres are given in [6] and [7].
In this poster we establish the equation for the Gaussian Curvature and for the Laplacian of a constant mean curvature surface in the Lorentz Group $\mathbb{L}^3$. Using the Gauss equation we prove that constant mean curvature surfaces in $\mathbb{L}^3$ with constant contact angle have constant Gaussian curvature. Also, we provide a congruence theorem for constant mean curvature surfaces immersed in the Lorentz space $\mathbb{L}^3$.

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