Constant angle surfaces in the special linear group $\mathrm{SL}(2,\mathbb{R})$ and in the Lorentzian Berger sphere

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Resumo/Abstract:

A *helix surface* or *constant angle surface* is a surface whose unit normal vector field forms a constant angle with a fixed field of directions of the ambient space. In [1] Cermelli and Di Scala start the study of these surfaces in $\mathbb{R}^3$ obtaining a remarkable relation with a Hamilton-Jacobi equation and showing their application to equilibrium configurations of liquid crystals.

Then, much work has been done to understand the geometry of the helix surfaces in others 3-dimensional Riemannian geometries and, also, in Lorentzian 3-manifolds.

In this talk, we present the results obtained in [2] and [3], about the study of helix surfaces in the special linear group, and in the Lorentzian Berger sphere, respectively. In both cases, the helix surfaces are locally characterized as the image of a 1-parameter family of isometries of the ambient space acting over a suitable curve.

References

[1] P. Cermelli, A. J. Di Scala. Constant-angle surfaces in liquid crystals. *Phil. Mag.* 87 (2007), 1871–1888.

[2] S. Montaldo, I.I. Onnis, A.P. Passamani. Helix surfaces in the special linear group. *Ann. Mat. Pura Appl.* 195 (2016), 59–77.

[3] I.I. Onnis,A.P. Passamani, P. Piu. Costant angle surfaces in the Lorentzian Berger Spheres. arXiv:1705.10090.