Geometry Session

Enneper representation of minimal surfaces in the three-dimensional Lorentz–Minkowski space

Adriana A Cintra
(UFG - Brazil)

Wednesday, February 7, 2024.
14h - 14h40

Math Department - SALA B

Abstract.

The Weierstrass representation formula for minimal surfaces in $\mathbb{R}^3$ is a powerful tool to construct examples and to prove general properties of such surfaces, since it gives a parametrization of minimal surfaces by holomorphic data. In [4] the authors described a general Weierstrass representation formula for simply connected immersed minimal surfaces in an arbitrary Riemannian manifold.

In [3], Andrade introduces a new method to obtain minimal surfaces in the Euclidean 3-space which is equivalent to the classical Weierstrass representation and, also, he proves that any immersed minimal surfaces in $\mathbb{R}^3$ can be obtained using it. This method has the advantage of computational simplicity, with respect to the Weierstrass representation formula and it allows to construct a conformal minimal immersion $\psi : \Omega \subset \mathbb{C} \to \mathbb{C} \times \mathbb{R}$, from a harmonic function $h : \Omega \to \mathbb{R}$, provided that we choose holomorphic complex valued functions L, P on the simply connected domain Ω such that $L_z\, P_z = (h_z)^2$. The immersion results in $\psi(z) = (L(z) - \overline{P(z)}, h(z))$ and it is called *Enneper immersion* associated to h. Besides, the image $\psi(\Omega)$ is called an *Enneper graph* of h.

Some extensions of the Enneper-type representation in others ambient spaces have been given in [2] and [5]. The aim of the paper is to illustrate an Enneper-type representation for timelike minimal surfaces in the Lorentz-Minkowski space $\mathbb{L}^3$ (veja [1]).

This is a joint work with Irene I Onnis (Università degli Studi di Cagliari.)

Palavra chave: Esfera de Berger; Fluxos Geométricos; Superfícies de rotação; Sólitons.

References

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[2] B. Daniel, *The Gauss map of minimal surfaces in the Heisenberg group*

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[4] F. Mercuri, S. Montaldo, P. Piu, *Weierstrass representation formula of minimal surfaces in* $\mathbb{H}_3$ *and* $\mathbb{H}^2 \times \mathbb{R}$, Acta Math. Sinica **22** (2006), 1603–1612.

[5] S. Montaldo, I.I. Onnis, *Enneper representation and the Gauss map of minimal surfaces in the product* $\mathbb{H}^2 \times \mathbb{R}$, Matemática Contemporânea **3** (2007), 199–213.