



Centro de Ciências Exatas e da Natureza  
Departamento de Matemática  
Secretaria de Pós-Graduação

# Colóquio do DMat

## A New Approach to Minimal and Maximal Hypersurfaces in Product Spaces

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Resumo:

In this talk we introduce a new method for the study of non-degenerate hypersurfaces immersed into product spaces of the form  $M_n \times \mathbb{R}$ , with  $M_n$  a Riemannian manifold, which are naturally endowed with two metrics: the standard Riemannian metric  $h_{iM} + dt^2$ , and the Lorentzian metric  $h_{iM} - dt^2$ . Naturally we can consider two mean curvatures and two Gaussian curvatures associated to the Riemannian and Lorentzian metrics. In this setting, we prove that a hypersurface having zero mean curvature with respect to both metrics must be foliated by hypersurfaces which are minimal submanifolds of the ambient space. As an application we prove that non-degenerate surfaces in a product space with zero mean curvature with respect to both metrics must be open pieces of slices, cylinders over geodesics or helicoids. Furthermore, we characterize flat surfaces as the unique nondegenerate surfaces in the Lorentz-Minkowski space having the same Gaussian curvature with respect to both metrics.

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Sala 209 - DMat - CCEN/UFPE

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