

SEMINARIO DI GEOMETRIA E ALGEBRA

UNIBA - POLIBA

Martedì 23 Settembre 2025 - Ore 15:30
Dipartimento di Matematica, aula XI, primo piano

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Vector fields as magnetic maps

Abstract. This talk is based on some joint papers with J. Inoguchi, (University of Hokkaido, Japan).

In our paper [IM14] we define the notion of magnetic map as a generalization of both magnetic curves and harmonic maps. A magnetic map is obtained as critical points of the LH functional, that is the energy functional together with a potential part. As a vector field can be thought of as a map from the manifold to its tangent bundle and since the tangent bundle carries a natural magnetic field obtained from its almost Kaehlerian structure, we may ask when a vector field is a magnetic map? Furthermore, we show that a unit vector field on an oriented Riemannian manifold is a critical point of the Landau Hall functional if and only if it is a critical point of the Dirichlet energy functional. Therefore, we provide a characterization for a unit vector field to be a magnetic map into its unit tangent sphere bundle.

References:

[IM14] J. Inoguchi and M.I. Munteanu, Magnetic maps, *Internat. J. Geom. Methods Mod. Phys.* 11 (2014) 6, art. n.1450058.

[IM15] J. Inoguchi and M.I. Munteanu, New examples of magnetic maps involving tangent bundles, *Rend. Semin. Mat. Univ. Politec. Torino* 73/1 (2015) 3-4, 101-116.

[IM18] J. Inoguchi and M.I. Munteanu, Magnetic vector fields: New examples, *Publ. Inst. Math. Beograd* 103 (117) (2018), 91-102.

[IM23] J. Inoguchi and M.I. Munteanu, Magnetic unit vector fields, *Revista de la Real Academia de Ciencias Exactas, Fisicas y Naturales. Serie A. Matematicas*, 117 (2023) 2, art. 71.



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