COLOQUIO JUNIOR

Miércoles 7 de mayo, 17:00h (café a las 16:30)

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Natural operations in differential geometry

Certain constructions and operations in differential geometry—known as natural operations—can be defined on any smooth manifold. Elementary examples include the Lie bracket of vector fields and the exterior derivative of differential forms. These operations serve as powerful tools that enable elegant and efficient computations, often avoiding the complexities of working in local coordinates.

Given their utility, a natural question arises: are there other such constructions that we may have overlooked? In this talk, I will present the theory of natural operations, which addresses this question by reducing it to the problem of finding invariant maps on Euclidean space under the action of specific groups. Using this framework, we can show, for example, that the Lie bracket is the unique bilinear natural operation on vector fields, and that any natural operator on differential forms is either the identity or the exterior derivative.

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