Tuesday 12th December 2017 - at 16:30
Aula Seminari “-1” – Dipartimento di Matematica

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ESSENTIAL SELF-ADJOINTNESS OF SUB-LAPLACIANS

ABSTRACT:

The aim of this seminar is to present recent results about essential self-adjointness of sub-Laplacians. For a sub-Riemannian manifold $M$ endowed with a volume measure $\omega$, this is a property of the sub-Laplacean $\Delta_\omega$ as an operator in $L^2(M)$ encoding the behavior of heat diffusion, wave propagation and quantum particles through $M$.

We present two types of results in this context. The first one, obtained in [2], consists in a self-adjointness criterion for sub-Laplacians on complete sub-Riemannian manifolds, defined with respect to singular measures. As a consequence, we prove that the sub-Laplacean defined with respect to an intrinsic measure (Poppi's measure) is essentially self-adjoint on the equiregular connected components of a sub-Riemannian manifold, under mild regularity assumptions on the singular region and when the latter does not contain characteristic points. This goes in the direction of a conjecture formulated by Boscain and Laurent in [1] and generalizes [3].

In the second part of the seminar we will present an ongoing work concerning the essential self-adjointness of the pointed sub-Laplacean, i.e., $\Delta$ defined on $C_c^\infty(M \setminus \{p\})$, $p \in M$. This highlights a strong difference with respect to the Riemannian case.

Both results follow by the study of suitable sub-Riemannian Hardy-type inequalities that have an independent interest.

Based on joint works with U. Boscain (CNRS & LJLL, Paris, France), D. Prandi (CNRS, CentraleSupélec, Gifves-sur-Yvette, France) and L. Rizzi (CNRS & Institut Fourier, Grenoble, France).

REFERENCES


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