AMS-UMI International
Joint Meeting 2024
Palermo, July 23–26, 2024

Advances in Geometric Control Theory and Subelliptic PDEs Special Session A16

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In the last decade, attention to sub-Riemannian geometries has rapidly spread in several directions. These are concerned with the geometrical aspects of control problems and the analytical properties of PDEs defined on such anisotropic structures. These problems arise from different natural models, such as the geometric theory of several complex variables, curvature problems, diffusion processes, human vision, and multi-agent dynamics. All of these models have in common the fact that their ellipticity directions span subspaces of dimension strictly less than the dimension of the state space, and all the remaining directions are recovered from commutators. This implies that the underlying geometric structure of the state space is of an anisotropic type, which plays a crucial role in the controllability properties of the dynamical system, as well as in the analysis and regularity of solutions to PDEs.

This special session aims to gather researchers interested in the study of geometric optimal control theory, linear/nonlinear elliptic and parabolic PDEs, and their connection represented by the sub-Riemannian setting. During the conference, we will primarily focus on the following themes: Hamilton-Jacobi equations and viscosity solutions tailored to the new geometric framework, qualitative and quantitative aspects of solutions to subelliptic PDEs such as Liouville properties, Harnack-type inequalities, and maximum principles driven by possibly degenerate elliptic and parabolic, linear and nonlinear, subelliptic operators.

We plan to divide the talks in this session into plenary communications, held by senior researchers aiming to present not only known results, but also open problems to inspire discussions and collaborations, and general communications aiming at spreading the most recent results.

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