

Mean value formulas for surfaces in Grushin spaces

Valentina Franceschi

Università degli Studi di Padova

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In this talk, we consider n -dimensional Grushin spaces, where a Riemannian metric degenerates along a line in the space, resulting in a sub-Riemannian structure. We discuss the validity of (sub-)mean value property for (sub-)harmonic functions on hypersurfaces within Grushin spaces of dimension $n > 2$. Our interest is driven by the classical counterpart: mean value formulas for harmonic functions on surfaces in the Euclidean setting are crucial for establishing the Bombieri-De Giorgi-Miranda gradient bound, which, in turn, plays a central role in the classical regularity theory. We conclude by presenting remarks and open questions about the regularity theory of minimal surfaces within this sub-Riemannian framework, which is yet to be established.