Abstract:

The main object of our research is the notion of “intrinsic regular surfaces” introduced and studied by Franchi, Serapioni, Serra Cassano in a Carnot group G. More precisely, an intrinsic regular hypersurface (i.e. a topological codimension 1 surface) $S \subset G$ is locally defined as a non critical level set of a $C^1$ intrinsic function. In a similar way, a k-codimensional intrinsic regular surface is locally defined as a non critical level set of a $C^1$ intrinsic vector function. Through Implicit Function Theorem, $S$ can be locally represented as an intrinsic graph by a function $\phi$. Here the intrinsic graph is defined as follows: let $V$ and $W$ be complementary subgroups of $G$, then the intrinsic graph of $\phi : W \to V$ is the set $\{A \cdot \phi(A) | A \in W\}$, where $\cdot$ indicates the group operation in $G$. A fine characterization of intrinsic regular surfaces in Heisenberg groups (examples of Carnot groups) as suitable 1-codimensional intrinsic graphs has been established in [1]. We extend this result in a general Carnot group introducing an appropriate notion of differentiability, denoted uniformly intrinsic differentiability, for maps acting between complementary subgroups of $G$. Finally we provide a characterization of intrinsic regular surfaces in terms of existence and continuity of suitable ‘derivatives’ of $\phi$ introduced by Serra Cassano et al. in the context of Heisenberg groups. All the results have been obtained in collaboration with Serapioni.


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