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Sobolev extensions of Lipschitz mappings into metric spaces

Abstract: Wenger and Young proved that the pair $(\mathbb{R}^m, \mathbb{H}^n)$ has the Lipschitz extension property for $m \leq n$ where $\mathbb{H}^n$ is the sub-Riemannian Heisenberg group. That is, for some $C > 0$, any L-Lipschitz map from a subset of $\mathbb{R}^m$ into $\mathbb{H}^n$ can be extended to a CL-Lipschitz mapping on $\mathbb{R}^m$. In this talk, I construct Sobolev extensions of such Lipschitz mappings with no restriction on the dimension m. I will show that any Lipschitz mapping from a compact subset of $\mathbb{R}^m$ into $\mathbb{H}^n$ may be extended to a Sobolev mapping on any bounded domain containing the set. More generally, I will explain this result in the case of mappings into any Lipschitz (n-1)-connected metric space