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Optimal embeddings and extensions for Triebel-Lizorkin spaces in spaces of homogeneous type

Embedding and extension theorems for certain classes of function spaces in \mathbb{R}^n (such as Sobolev spaces) have played a fundamental role in the area of partial differential equations. In this talk, we will discuss some recent work which builds upon such results and identifies necessary and sufficient conditions guaranteeing that certain Sobolev-type inequalities and extension results hold for the scale of Triebel-Lizorkin spaces ($M_{p,q}^s$ spaces) in the general context of spaces of homogeneous type. An interesting facet of this work is how the range of s (the smoothness parameter) for which these inequalities and extension results hold is intimately linked to the geometric makeup of the underlying space. This talk is based on joint work with Dachun Yang and Wen Yuan.