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- **Title: An Extension Theorem in Weighted Sobolev Space**

In 1934, Hassler Whitney published three papers about extending smooth functions from a subset of $\mathbb{R}^n$ to the entire space. Under a compatibility condition on the mth order jets on an arbitrary set E, he constructed a linear extension operator from $C^m(E)$ to $C^m(R^n)$. This work was generalized to $C^{m,\alpha}$ by Georges Glaeser in 1958, and it can be thought of as a partial converse to Taylor's theorem. If instead of jets at each point of E, we are given only function values, under what conditions does this function extend to one in $C^m(R^n)$? Glaeser answered this question with a technical condition for f to be the restriction of a C^1-function. His work was expanded to specific class of sets by Bierstone, Millman, and Pawlucki in 2003 and 2006, and to E finite and then arbitrary by Charles Fe fferman in 2003-2004. We consider a similar question for weighted Sobolev Space: Does there exist a linear extension operator T, mapping functions from the space of restrictions of $L^{m,p}(d\mu, R^n)$ functions to an arbitrary set E, to functions in the space $L^{m,p}(d\mu, R^n)$? Building on work by Arie Israel and Pavel Shvartsman, in 2012, Israel, Luli, and Fefferman proved that such a bounded operator exists for the (unweighted) Sobolev space, $L^{m,p}(R^n)$ for p>n. We will discuss relevant techniques and ideas from the field, construct a linear extension operator for a specific class of weights, and discuss progress toward a more complete answer to this question.