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A Meyers-Serrin Theorem for Degenerate Sobolev Spaces

It is well understood that degenerate elliptic PDEs in divergence form play an important role in many areas of mathematics. For a non-negative definite measurable matrix valued function $A(x)$ and $1 \leq p < \infty$, the degenerate matrix-weighted Sobolev spaces $\mathcal{H}_A^{1,p}(\Omega)$ (defined as a completion of $C^\infty(\Omega)$) and $\mathcal{W}_A^{1,p}(\Omega)$ (defined as a collection of functions with locally integrable distributional derivatives) play a central role in regularity theory and applications. In this talk, I present joint work with D. Cruz-Uribe and K. Moen that gives a sharp condition on the matrix function A for the equality $\mathcal{H}_A^{1,p}(\Omega) = \mathcal{W}_A^{1,p}(\Omega)$.