THE EXTENSION OPERATOR IN VARIABLE EXPONENT FUNCTION SPACES

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Abstract. We study function spaces of Besov and Triebel-Lizorkin type with variable smoothness and variable integrability. Lebesgue spaces with variable exponent $L_{p(\cdot)}(\Omega)$ have already been considered by Orlicz in 1931.
The modern development startet in the '90 s with upcoming applications of these spaces in the theory of electrorheological fluids, image processing and financial mathematics. On the the other hand, Diening made a major breakthrough by showing in 2004 that the Hardy-Littlewood maximal operator is bounded on $L_{p(\cdot)}(\Omega)$ if $p : \Omega \to (c, \infty]$ fulfills certain regularity conditions.
In our talk we also study different types of variable smoothness, which we will measure by admissible weight sequences $(w_j)_{j\in\mathbb{N}_0}$. Usually the spaces are defined as subsets of distributions on $\mathbb{R}^n$. In our talk we will focus on an intrinsic definition of these spaces on special Lipschitz domains $\Omega \subset \mathbb{R}^n$ and we will give an example of a linear and bounded extension operator $\mathcal{E} : A^w_{p(\cdot),q(\cdot)}(\Omega) \to A^w_{p(\cdot),q(\cdot)}(\mathbb{R}^n)$. At the end, this operator can be modified to be an universal extension operator, i.e. it does the extension from Ω to $\mathbb{R}^n$ as above, but is independent on the parameters $p, q, (w_j)$ involved.

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