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The maximal operator, weights and extrapolation on variable Lebesgue spaces

The variable Lebesgue spaces are a generalization of the classical L^p spaces, replacing the constant exponent p with a function $p(\cdot)$. We will discuss recent work to establish a theory of weighted norm inequalities on these spaces, primarily by extending the theory of Rubio de Francia extrapolation to this setting. This requires a good understanding of the Hardy-Littlewood maximal operator. If time allows, we will also discuss work on the structure of A_p weights in the variable exponent setting, an area where a great deal of work remains to be done.