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Sufficient criteria for boundedness of maximal operator on weighted generalized Orlicz spaces

Although generalized Orlicz spaces have been actively studied during the last 20 years, weighted generalized Orlicz spaces have received little attention. The weighted space is defined with a weighted modular

$$\int_{\mathbb{R}^n} \varphi(x, |f(x)|)\omega(x)\, dx,$$

where φ is essentially 'unweighted' and ω is a weight function. The crucial question is to give a property for the weight ω so that the Hardy-Littlewood maximal operator M is bounded. In this talk, sufficient properties are discussed in special cases: $\phi(x,t) = \phi(t)$ (*Orlicz spaces*), $\phi(x,t) = t^p$ (*Lebesgue spaces* L^p), $\phi(x,t) = t^{p(x)}$ (*variable exponent Lebesgue spaces* $L^{p(\cdot)}$) and $\phi(x,t) = t^p + a(x)t^q$ (*double phase spaces*). Lastly, a sufficient condition for the boundedness of M in weighted generalized Orlicz space is given.