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TRANSFERENCE AND RESTRICTION OF FOURIER MULTIPLIERS ON ORLICZ SPACES

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Abstract. Let G be a locally compact abelian group with Haar measure m_G and Φ_1, Φ_2 be Young functions. A bounded measurable function m on G is called a (Φ_1, Φ_2)-multiplier if

$$T_m(f)(\gamma) = \int_G m(x)\hat{f}(x)\gamma(x)dm_G(x),$$

defined for functions in $f \in L^1(\hat{G})$ such that $\hat{f} \in L^1(G)$, extends to a bounded operator from $L^{\Phi_1}(\hat{G})$ to $L^{\Phi_2}(\hat{G})$, where $\hat{G}$ stands for the dual group. We write $\mathcal{M}_{\Phi_1,\Phi_2}(G)$ for the space of (Φ_1, Φ_2)-multipliers on G and study some properties of this class. We give necessary and sufficient conditions for m to be a (Φ_1, Φ_2)-multiplier on various groups such as $\mathbb{R}$, $\mathbf{D}$, $\mathbb{Z}$ and $\mathbb{T}$. In particular we prove that regulated (Φ_1, Φ_2)-multipliers defined on $\mathbb{R}$ coincide with (Φ_1, Φ_2)-multipliers defined on the real line with the discrete topology $\mathbf{D}$, under certain assumptions involving the norm of the dilation operator acting on Orlicz spaces. Also several transference and restriction results on multipliers acting on $\mathbb{Z}$ and $\mathbb{T}$ are achieved.

References

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