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ON A CERTAIN CONVERSE OF HÖLDER'S INEQUALITY FOR LORENTZ SPACES

In this talk I shall discuss some results obtained jointly with T. S. Quek. Our work is motivated by our interest in the Fourier-Stieltjes transforms of measures μ in M(G), the measure algebra defined on a locally compact Abelian group G. Since every non-discrete locally compact Abelian group G that is not σ-compact contains a locally null non-null subset, it is *not* sufficient, for our purposes, to consider only σ-finite measure spaces $(X,\mathcal{A},\mu)$ in our formulation of the converse of Hölder's inequality for Lorentz spaces.

We recall the following definitions.

Definition 1. Let $(X,\mathcal{A},\mu)$ be a measure space. A set $A \in \mathcal{A}$ is said to be a *locally null* set if $A \cap F$ is a null set (i.e., $\mu(A \cap F) = 0$) for every measurable set F with $\mu(F) < \infty$.

Definition 2. Let f be a measurable function defined on a measure space $(X,\mathcal{A},\mu)$. For $y \geq 0$, we define

$$\mu(f,y) = \mu\{x \in X : |f(x)| > y\}.$$