

An algebra of convolution type operators with discontinuous data

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Let $\mathfrak{B}_{p,w}$ be the Banach algebra of all bounded linear operators acting on the weighted Lebesgue space $L^p(\mathbb{R}, w)$ where $1 < p < \infty$ and w is a Muckenhoupt weight. We study the Banach subalgebra $\mathfrak{A}_{p,w}$ of $\mathfrak{B}_{p,w}$ generated by all operators of the form $a\mathcal{F}^{-1}b\mathcal{F}$ where \mathcal{F} is the Fourier transform, the functions $a, b \in L^\infty(\mathbb{R})$ admit piecewise slowly oscillating discontinuities on $\mathbb{R} \cup \{\infty\}$ and b is the Fourier multiplier on $L^p(\mathbb{R}, w)$. Applying results on pseudodifferential operators with non-regular symbols, the Allan-Douglas local principle and the limit operators techniques, we construct a Fredholm symbol calculus for the Banach algebra $\mathfrak{A}_{p,w}$. As a result, a Fredholm criterion for the operators $A \in \mathfrak{A}_{p,w}$ in terms of their symbols is established.

The talk is based on a joint work with I. Loreto Hernández.