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 L^p functional calculus for the Ornstein-Uhlenbeck operator

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ABSTRACT: Consider a self-adjoint operator A on $L^2(\mu)$, where (M, μ) is a measure space. A bounded Borel function m on \mathbb{R} is called an L^p -multiplier for A ($1 \leq p < \infty$), if the operator $m(A)$, defined spectrally on $L^2(\mu)$, extends from $L^p \cap L^2(\mu)$ to a bounded operator on $L^p(\mu)$. The set $\mathcal{M}_p(A)$ of L^p -multipliers forms a Banach algebra. Necessary and sufficient conditions for membership in $\mathcal{M}_p(A)$ have useful applications in spectral theory, in potential theory, to partial differential equations, in scattering theory ...

In the last thirty-odd years this problem has been investigated for several generalized Laplacians (Laplace-Beltrami operators on Riemannian manifolds, sums of squares of vector fields, Schrödinger operators ...) I shall discuss some results for the Ornstein-Uhlenbeck operator, a “natural” Laplacian on the Euclidean space with Gauss measure.