THE ORNSTEIN-UHLENBECK PROCESS ASSOCIATED WITH THE LÉVY LAPLACIAN AND ITS DIRICHLET FORM

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Abstract: We prove the existence of an Ornstein-Uhlenbeck type process associated with the Lévy Laplacian. Like the classical case, the law of the Lévy Brownian motion at time 1 is an invariant probability of this process. The corresponding semigroup is explicitly described and the related Dirichlet form is constructed. There exist other parallels with the classical situation such as the hypercontractivity of the semigroup, an analogue of the Cameron-Martin space, etc. However, unlike the classical case in our setting the cylindrical functions do not form a core of the Dirichlet form, in fact the form is identically zero on them. In this sense the Lévy Ornstein-Uhlenbeck process provides an example of a new type of a *gradient-type* (or classical) Dirichlet form which is essentially infinite dimensional.

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