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Boundary value problems in the Wiener space:

We consider boundary value problems in the Wiener space with the Neumann boundary condition. The domain is given as $D = \{x : p(x) \leq 0\}$ where p is a non-degenerate smooth function in the sense of Malliavin. We restrict the Wiener measure to D and we denote this restriction by μ. Let L be the Ornstein-Uhlenbeck operator and we denote by n the outer normal vector. Our elliptic differential equation is of the following form:

$$Lu \ = f, \tag{1}$$

$$\frac{\partial u}{\partial n} \ = 0. \tag{2}$$

Here f is a given function.

We formulate this problem in terms of Dirichlet form. We discuss the regularity of the solution. To be precise, for a given $f \in L^2(\mu)$, we show that the solution u is locally twice differentiable.

We can consider the Dirichlet boundary condition similarly.

The global regularity of the solution and the essentially self-adjointness is the future problem.