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MARKOV UNIQUENESS AND ESSENTIAL SELF-ADJOINTNESS OF PERTURBED ORNSTEIN-UHLENBECK OPERATORS

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0. Iutroduction

Stating from a simple formula, we shall show in this paper some elementary inequalities on the Wiener space. We shall give two applications of these inequalities. The first one is a quick proof of the Markov uniqueness of the perturtions of Wiener measure. The second one is to prove the essential self-adjointness of the perturbed Ornstein-Uhlenbeck operatros on Wiener space, when the perturbation satisfies some kind of Lipschitz boundedness condition.

The Markov uniqueness and essential self-adjointness problems are one of the basic questions on Dirichlet forms. There are many studies on these subjects. We mention in the references the papers of Albeverio-Kondratiev-Röckner, of Albeverio-Kusuoka, Albeverio-Röckner-Zhang, of Röckner-Zhang, of Song, of Takeda, of Wielens, etc. The present paper tries to give a simpler proof of the Markov uniqueness, and to extend the result of Wielens [11] to the Wiener space. It will be noticed that our proof of the Markov uniqueness does not use the maximality property as it did in Song [8] (cf. also Albeverio-Kusuoka-Röckner [3]), and our method to prove the essential self-adjointness is different from that used in Wielens [11].

1. Notations

In this paper E denotes the space $C_0(\boldsymbol{R}_+, \boldsymbol{R}^d)$ and m denotes the classical Wiener measure on E. Let ι denote the usual imbedding map from the topological dual space E^* of E into E. For any element $k \in \iota(E^*) \subset E$, we shall put $a_k = \iota^{-1}(k)$. Recall that E^* is a pre-Hilbert space with the inner product $\int (a_k)^2(x) m(dx)$. We fixe an orthonormal basis K of E^*. We introduce the space $FC_b^\infty(K)$ to be the family of the functions u on E such that there is $n \in N$, $f \in$