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Stochastic quantization of the Fermi oscillator: non- Z_2 route. (English) Zbl 0569.60099
Univ. Bielefeld, Forschungszentr. Bielefeld-Bochum-Stochastik 62, 10 p. (1985).

Problem 15 raised by *E. Nelson* in his "Quantum fluctuations" (1985; [Zbl 0563.60001](#)) is "to find a stochastic field theory of half integral spin Fermi fields using ordinary diffusion theory". The simplest example of the underlying system - the Fermi oscillator - has met a variety of stochastic descriptions, each being based on a discrete event set (Z_2).

We demonstrate that it is in principle possible to describe the Fermi oscillator in terms of ordinary diffusion processes by following the method advocated by the present author of embedding Fermi or spin systems in (mother) Bose ones.

This particular "bosonization" method (entirely different from the more popular Skyrme-Coleman's route) seems to be promising in the probabilistic context, see e.g. *R. L. Hudson* and *R. K. Parthasarathy*, Unification of the Fermion and Boson stochastic calculus. *Commun. Math. Phys.* to appear; and the author, Some aspects of the Boson- Fermion (in)equivalence: A remark on the paper by Hudson and Parthasarathy, Univ. Bielefeld, Forschungszentr. Bielefeld-Bochum- Stochastik 9 (1985).

MSC:

[60K35](#) Interacting random processes; statistical mechanics type models; percolation theory
[81P20](#) Stochastic mechanics (including stochastic electrodynamics)

Keywords:

[Fermi oscillator](#)