

Renormalization-group transformation in a $2n$ -component fermionic hierarchical model

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Abstract

We study the $2N$ -component fermionic model on a hierarchical lattice and give explicit formulas for the renormalization-group transformation in the space of coefficients that determine a Grassmann-valued density of the free measure. We evaluate the inverse renormalization-group transformation. The definition of the renormalization-group fixed points reduces to a solution of a system of algebraic equations. We investigate solutions of this system for $N = 1, 2, 3$. For $\alpha = 1$, we prove an analogue of the central limit theorem for fermionic $2N$ -component fields. We discover an interesting relation between renormalization-group transformations in bosonic and fermionic hierarchical models and show that one of these transformations is obtained from the other by replacing N with $-N$. © 2006 Springer Science+Business Media, Inc.

<http://dx.doi.org/10.1007/s11232-006-0019-3>

Keywords

Hierarchical models, N -component fermionic fields, Renormalization group