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The hierarchical random field Ising model. (English) Zbl 1086.82573
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Summary: We introduce and solve explicitly a hierarchical approximation to the random field Ising model. This approximation is defined in terms of Peierls' contours. It exhibits a spontaneous magnetization in $d > 2$ and illustrates some of the ideas used in the proof of that result for the real RFIM. In $d = 2$, there is no spontaneous magnetization, but a very slow decay of correlations. However, we argue that this latter property is an artifact of the approximation. For the real RFIM, we expect exponential decay of correlations for any value of the disorder.

MSC:

- 82D30** Statistical mechanical studies of random media, disordered materials (including liquid crystals and spin glasses)
82B20 Lattice systems (Ising, dimer, Potts, etc.) and systems on graphs arising in equilibrium statistical mechanics

Cited in **30** Documents

Keywords:

Random fields; renormalization group; Peierls contours

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