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Tensor renormalization group: Local magnetizations, correlation functions, and phase diagrams of systems with quenched randomness[1]
CAN GÜVEN, MICHAEL HINCZEWSKI, University of Maryland, A. NIHAT BERKER, Sabanci University — The tensor renormalization-group method, developed by Levin and Nave, brings systematic improvability to the position-space renormalization-group method and yields essentially exact results for phase diagrams and entire thermodynamic functions. The method, previously used on systems with no quenched randomness, is extended in this study to systems with quenched randomness [1]. Local magnetizations and correlation functions as a function of spin separation are calculated as tensor products subject to renormalization-group transformation. Phase diagrams are extracted from the long-distance behavior of the correlation functions. The approach is illustrated with the quenched bond-diluted Ising model on the triangular lattice. An accurate phase diagram is obtained in temperature and bond-dilution probability for the entire temperature range down to the percolation threshold at zero temperature.

[1] C. Güven, M. Hinczewski, and A.N. Berker, Phys. Rev. E 82, 051110 (2010).

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