Duplicate Ising Model

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Resumo/Abstract:

In this work we use a graphical representation of the Ising model with non-uniform field to obtain a characterization of percolation and the uniqueness of DLR measures. As is already known for Ising models with non-zero uniform field, by an application of the Lee - Yang Theorem, one can prove the non- existence of phase transition. In contrast, for Ising models with zero field it is known that phase transition exists, by an argument due to Peierls. In one of references, dating from 2009, first order phase transition is characterized for Ising models with non- uniform summable fields, as well as the absence of phase transition for the Ising model with uniformly bounded fields. Already in the recent literature we find a characterization of Ising models with spatially dependent magnetic fields, which guarantees phase transition for certain values depending on the the field. Our study is useful in the sense that one can characterize the uniqueness of DLR measures at lower temperatures, using graphical representations of the Ising model associated with spatially dependent magnetic fields, following the approaches of L. Chayes, J. Matcha and O. Redner, see [2].

References

[1] R. Bissacot and L. Cioletti, *Introdução a Teoria das Medidas de Gibbs* , Notas de aula, 2012.

[2] L, Chayes , J. Machta, and O, Redner. *Graphical Representations for Ising Systems in External Fields* , Journal Stat. Phys., vol 93 (1998).

[3] G.R. Grimmett, *The random-cluster model*, vol. 333 of Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Math. Sciences], Springer-Verlag, Berlin, 2006.