TRANSLATION-INVARIANT p-ADIC QUASI-GIBBS MEASURES FOR THE ISING-VANNIMENUS MODEL ON A CAYLEY TREE

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Abstract

We consider the p-adic Ising-Vannimenus model on the Cayley tree of order k = 2. This model contains nearest-neighbor and next-nearest-neighbor interactions. We investigate the model using a new approach based on measure theory (in the p-adic sense) and describe all translation-invariant p-adic quasi-Gibbs measures associated with the model. As a consequence, we can prove that a phase transition exists in the model. Here, "phase transition" means that there exist at least two nontrivial p-adic quasi-Gibbs measures such that one is bounded and the other is unbounded. The methods used are inapplicable in the real case.

Keywords

Author Keywords: p-adic numbers; Ising-Vannimenus model; p-adic Gibbs measure; dynamical system; phase transition; Cayley tree

KeyWords Plus: POTTS-MODEL; DYNAMICAL-SYSTEMS; PHASE-TRANSITIONS; LAMBDA-MODEL

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