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Translation-invariant p-adic quasi-Gibbs measures for the Ising–Vannimenus model on a Cayley tree (Article)

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Abstract

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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. © 2016, Pleiades Publishing, Ltd.

Author keywords

Cayley tree dynamical system Ising–Vannimenus model p-adic Gibbs measure p-adic numbers phase transition

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References (34)

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1 Mukhamedov, F., Dogan, M., Akin, H.
Phase transition for the p-adic Ising-Vannimenus model on the Cayley tree
(2014) *Journal of Statistical Mechanics: Theory and Experiment*, 2014 (10), art. no. P10031. Cited 5 times.
http://iopscience.iop.org/1742-5468/2014/10/P10031/pdf/1742-5468_2014_10_P10031.pdf
doi: 10.1088/1742-5468/2014/10/P10031
View at Publisher

2 Khakimov, O.N.
On p-adic Gibbs measures for Ising model with four competing interactions
(2013) *P-Adic Numbers, Ultrametric Analysis, and Applications*, 5 (3), pp. 194-203. Cited 7 times.
www.springer.com/mathematics/algebra/journal/12607
doi: 10.1134/S2070046613030023
View at Publisher

3 Khakimov, O.N.

p-Adic Gibbs quasimeasures for the Vannimenus model on a Cayley tree

(2014) *Theoretical and Mathematical Physics*, 179 (1), pp. 395-404. Cited 4 times.
http://www.kluweronline.com/issn/0040-5779
doi: 10.1007/s11232-014-0151-4

View at Publisher

4 Baxter, R.J.

The inversion relation method for some two-dimensional exactly solved models in lattice statistics

(1982) *Journal of Statistical Physics*, 28 (1), pp. 1-41. Cited 4262 times.
doi: 10.1007/BF01011621

View at Publisher

5 Khamraev, M., Mukhamedov, F.

On P-adic λ-model on the Cayley tree

(2004) *Journal of Mathematical Physics*, 45 (11), pp. 4025-4034. Cited 21 times.
doi: 10.1063/1.1792932

View at Publisher

6 Mukhamedov, F., Dogan, M.

On P-Adic λ-model on the cayley tree II: Phase transitions

(2015) *Reports on Mathematical Physics*, 75 (1), pp. 25-46. Cited 6 times.
http://www.elsevier.com//locate/issn/00344877
doi: 10.1016/S0034-4877(15)60022-2

View at Publisher

7 Mukhamedov, F.

A Dynamical System Approach to Phase Transitions for p-Adic Potts Model on the Cayley Tree of Order Two

(2012) *Reports on Mathematical Physics*, 70 (3), pp. 385-406. Cited 18 times.
doi: 10.1016/S0034-4877(12)60053-6

View at Publisher

8 Mukhamedov, F.

On Dynamical Systems and Phase Transitions for q + 1-state p-adic Potts Model on the Cayley Tree

(2013) *Mathematical Physics Analysis and Geometry*, 16 (1), pp. 49-87. Cited 24 times.
doi: 10.1007/s11040-012-9120-z

View at Publisher

9 Mukhamedov, F.

On the strong phase transition for the one-dimensional countable state p-adic Potts model

(2014) *Journal of Statistical Mechanics: Theory and Experiment*, 2014 (1), art. no. P01007. Cited 12 times.
http://iopscience.iop.org/1742-5468/2014/1/P01007/pdf/1742-5468_2014_1_P01007.pdf
doi: 10.1088/1742-5468/2014/01/P01007

View at Publisher