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## Renormalization Method in p-Adic lambda-Model on the Cayley Tree

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### Abstract

In the present paper, it is proposed the renormalization techniques in the investigation of phase transition phenomena in p-adic statistical mechanics. We mainly study p-adic lambda-model on the Cayley tree of order two. We consider generalized p-adic quasi Gibbs measures depending for the lambda-model. Such measures are constructed by means of certain recurrence equation, which defines a dynamical system. We study two regimes with respect to parameters. In the first regime we establish that the dynamical system has one attractive and two repelling fixed points, which predicts the existence of a phase transition. In the second regime the system has two attractive and one neutral fixed points, which predicts the existence of a quasi phase transition. A main point of this paper is to verify (i.e. rigorously prove) and confirm that the indicated predictions (via dynamical systems point of view) are indeed true. To establish the main result, we employ the methods of p-adic analysis, and therefore, our results are not valid in the real setting.

### Keywords

**Author Keywords:** p-adic numbers; p-adic quasi Gibbs measure; Phase transition; Dynamical system; Cayley tree

**KeyWords Plus:** NON-ARCHIMEDEAN FIELDS; DYNAMICAL-SYSTEMS; POTTS-MODEL; GIBBS MEASURES; PHASE-TRANSITIONS; REPLICIA SYMMETRY; BETHE LATTICES; BREAKING; BEHAVIOR

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