p-ADIC GIBBS MEASURES OF q-STATES POTTS MODEL ON CAYLEY TREE

ABSTRACT. We study the set of p-adic Gibbs measures of the q-states Potts model on Cayley tree of order three. We prove the vastness of the set of the periodic p-adic Gibbs measures for such models by showing the chaotic behavior of the corresponding Potts–Bethe mapping over $\mathbb{Q}_p$ for prime numbers $p \equiv 1 \pmod 3$. In fact, for $0 < |\theta - 1|_p < |q|_p^2 < 1$ where $\theta = \exp_p(J)$ and J is a coupling constant, there exists a subsystem that is isometrically conjugate to the full shift on three symbols. Meanwhile, for $0 < |q|_p^2 \leq |\theta - 1|_p < |q|_p < 1$, there exists a subsystem that is isometrically conjugate to a subshift of finite type on r symbols where $r \geq 4$. However, these subshifts on r symbols are all topologically conjugate to the full shift on three symbols.