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Uniform Cluster Estimates for Lattice Models

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Abstract. In [2] we obtained the complete cluster expansion for transfer-matrix for lattice models with bounded potentials in high-temperature region. Here we obtain necessary cluster estimates for semiinvariants of functionals over Gibbs field with unbounded interaction in high-temperature region and for contour models in low-temperature region.

Contents

Introduction

One of the main obstacles on the way to the proof of asymptotic completeness for $\lambda P(\varphi)_2$ models of quantum field theory for small λ was the absence of N-particle cluster expansion for all N in $0<\lambda<\lambda_0$. Glimm, Jaffe and Spencer [1] obtained N-particle cluster expansion with $N\to\infty$ if $\lambda\to 0$.

In [2] the author obtained the complete cluster expansion (i.e. for all N) in high temperature region $|\beta|<\beta_0$ for lattice fields with bounded interaction potential. The main ingredients in [2] were strong cluster estimates of semiinvariants $\langle F_{B_1},\dots,F_{B_n}\rangle$ where F_B depends only on values of Gibbs random field in points $\iota\in B$, B is finite.

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