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Estimating interactions in binary lattice data with nearest-neighbor property. (English)

Zbl 0668.62059

Kybernetika 23, 136-142 (1987).

The estimation problem for the interaction parameter $U \in R^3$ of a two-state Markov stationary Gibbs random field on $(\mathbb{Z}^+)^2$ is considered. Let $x_{D(m,n)}$ be an observation of the field on a rectangular domain $D(m,n)$ of size $m \times n$, and put $\hat{U}_{m,n}$ for the empirical minimum estimator for U from theorem 3.12 of the well-known book of *D. Ruelle* [Thermodynamic formalism. The mathematical structures of classical equilibrium. Statistical mechanics. (1978; Zbl 0401.28016)].

Theorem: $\hat{U}_{m,n} \rightarrow U$ almost sure for $m,n \rightarrow \infty$. An approximate calculation method for the values of $\hat{U}_{m,n}$ through $x_{D(m,n)}$, and an example are given.

Reviewer: [E.I.Trofimov](#)

MSC:

- 62M05 Markov processes: estimation; hidden Markov models
- 62M99 Inference from stochastic processes
- 82B30 Statistical thermodynamics
- 80A10 Classical and relativistic thermodynamics

Cited in 3 Documents

Keywords:

two-state Markov stationary Gibbs random field; empirical minimum estimator

Full Text: [EuDML](#)

References:

- [1] J. E. Besag: On the statistical analysis of nearest-neighbor systems. Proceedings 9. European meeting of statisticians, Budapest 1972. · Zbl 0311.60028
- [2] N. Dunford, J. T. Schwartz: Linear Operators, I. Interscience, New York 1958. · Zbl 0084.10402
- [3] M. Janžura: Estimating interactions in binary data sequences. Kybernetika 22 (1986), 5, 377-384. · Zbl 0629.60104 · eu-dml:27732
- [4] D. H. Mayer: The Ruelle-Araki Transfer Operator in Classical Mechanics. (Lecture Notes in Physics 123.) Springer-Verlag, Berlin-Heidelberg-New York 1980. · Zbl 0454.60079
- [5] D. Ruelle: Thermodynamic Formalism. Addison Wesley, Reading, Mass. 1978. · Zbl 0401.28016
- [6] D. Simon: A remark on Dobrushin's uniqueness theorem. Comm. Math. Phys. 68 (1979), 183-185. · Zbl 0435.60099 · doi:10.1007/BF01418127
- [7] D. J. Strauss: Analysing binary lattice data with the nearest-neighbor property. J. Appl. Probab. 72 (1975), 702-712. · Zbl 0322.62072 · doi:10.2307/3212721

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