

INFERENCE ABOUT THE SHAPE OF NEIGHBORING POINTS IN FIELDS

J. L. Denny and A. L. Wright
Department of Statistics
University of Arizona
Tucson, Arizona 85721
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ABSTRACT

One observes a finite sample from a discrete process indexed by a d -dimensional lattice, $d \geq 1$. If $d = 1$ and it is assumed that the process is a Markov chain of order at most t , known, then procedures are available for estimating the order and obtaining the admissible confidence intervals. These procedures are (partially) extended to Markov fields, $d \geq 2$, where it is necessary to consider shapes and where the "order" is described by the nearest neighbor potential. Bayes tests are obtained for testing independence against a dependence described by an arbitrary clique. The equivalence of a minimal sufficient statistic and a canonical nearest neighbor Gibbs potential is obtained for arbitrary Markov chains and for Markov fields which are exponential families.