Computing bounds for entropy of stationary Z^d-Markov Random Fields

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Abstract: Given a stationary Z^d-Markov random field μ that satisfies a spatial mixing property, known as strong spatial mixing, we give general upper and lower bounds to the entropy of μ. In the case of a stationary nearest-neighbor Z^d-Gibbs measure, we use these to get computable sequences of upper and lower approximations that converge to the entropy. In the case $d = 2$, these approximations are efficient in the sense that they are accurate to within ϵ and can be computed in time polynomial in $1/\epsilon$. If time permits, we will discuss a representation for pressure that provides an alternative approach in some cases.