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Long Range Effects in the Hard-Core and Related Models

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We'll discuss questions of the type: for a given (large) discrete random system, to what extent do events in one part of the system affect probabilities in other, distant parts?

For instance the hard-core lattice gas model involves random placements of particles on vertices (“sites”) of some graph (e.g., an integer lattice), subject to the rule that neighboring sites cannot be simultaneously occupied. One may then ask (e.g.) whether occupation of a given site v can have much effect on occupation probabilities for sites far from v.

We will describe a few things that are known along these lines, but probably more that are not.