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Section:

13. Combinatorics

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Kayll, P. Mark, University of Montana, USA:
Stochastic independence properties of hard-core distributions
A probability measure p on the set $\mathcal{M}$ of matchings in a multigraph Γ is *hard-core* if for some $\lambda : \Gamma \to [0, \infty)$, the probability $p(M)$ of $M \in \mathcal{M}$ is proportional to $\prod_{A \in M} \lambda(A)$. Such distributions enjoy substantial approximate stochastic independence properties. For example, if M is chosen according to the hard-core distribution p, $\mathrm{MP}(\Gamma)$ is the matching polytope of Γ, $\delta > 0$ is fixed, and if the vector of *marginals*, $(\Pr(A \in M) : A$ an edge of $\Gamma)$, is in $(1-\delta)\mathrm{MP}(\Gamma)$, then $\frac{\Pr(A,B \in M)}{\Pr(A \in M)\Pr(B \in M)} \to 1$ as the distance between $A, B \in \Gamma$ tends to infinity. Applications of these results include the resolutions of several questions involving asymptotic colouring behaviour of multigraphs. The talk is based on joint work with Jeff Kahn.
Reference: J. Kahn and P. M. Kayll, On the stochastic independence properties of hard-core distributions, *Combinatorica* **17** (1997), 369–391.