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Local algorithms for independent sets in random graphs

How large can an independent set be in a random d-regular graph? How large can it be if we are to construct it using a (possibly randomized) algorithm that is local in nature? We will discuss a notion of local algorithms for combinatorial optimization problems on large, random d-regular graphs. We will then briefly explain why, for asymptotically large d, local algorithms can only produce independent sets of size at most half of the largest ones. The factor of 1/2 turns out to be optimal. Joint work with Bálint Virág.