

Cuts in Random Cubic Graphs

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Random 3-regular graphs are a particularly simple random structure, the bisection of (general) cubic graphs plays a role in the construction of efficient exponential-time algorithms, and it seems likely that random graphs are extremal. It is known that a random cubic graph has a (minimum) bisection of size at most $1/6$ times its order (indeed this is known for all cubic graphs), and we reduce this to below $1/7$ (to 0.13993) by analyzing an algorithm with a couple of surprising features. We increase the corresponding lower bound on minimum bisection (from $1/9.9$ to 0.10133) using the Hamilton cycle model of a random cubic graph, and use the same approach to decrease the upper bound on maximum cut (from 1.4026 to 1.40031). We will discuss some related conjectures.