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Average-case complexity of detecting cliques

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概要

We investigate the average-case complexity of the k-CLIQUE problem on random graphs with an appropriate density of edges. Our results are lower bounds of $n^{k/4}$ for two well-studied classes of circuits: bounded-depth circuits and monotone circuits. Besides being the first lower bounds for k-CLIQUE in the average-case (and moreover essentially tight), these results lead to a new "size hierarchy theorem" for AC^0 and settle a longstanding open question in finite model theory.

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