On The Complexity of Circuit Satisfiability

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We present a gap theorem regarding the complexity of the circuit satisfiability problem. We prove that the success probability of deciding Circuit Satisfiability for deterministic circuits with $n$ variables and size $m$ is either $2^{-n}$ or $2^{-o(n)}$ when restricted to probabilistic circuit families $\{C_{n,m}\}$ where the size of $C_{n,m}$ is bounded by $2^{o(n)} poly(m)$. 