

# ON THE AVERAGE-CASE COMPLEXITY OF REAL FEASIBILITY FOR CIRCUIT HYPERSURFACES

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Deciding whether even a single polynomial equation has a real solution is NP-hard, so it is natural to look for speed-ups. One speed-up comes from sparsity, but the necessary tools involve diophantine approximation, e.g., Baker's Theorem on linear forms in logarithms. Further improvements seem to require randomization,

So we propose a randomized version of Baker's Theorem which appears to be new. As a consequence, we can show that deciding real feasibility for  $n$ -variate  $(n+2)$ -nomials can be sped up if one averages over exponents. We also discuss some preliminary work on averaging over coefficients.

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