Testing the Variety Hypothesis

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Given a probability measure on the unit disk, we study the problem of deciding whether, for some threshold probability, this measure is supported near a real algebraic variety of given dimension and bounded degree. We call this *testing the variety hypothesis*. We prove an upper bound on the so-called sample complexity of this problem and show how it can be reduced to a semialgebraic decision problem. This is achieved by studying in a quantitative way the Hausdorff geometry of the space of real algebraic varieties of fixed dimension and degree.

Joint work with P. Roos Hoefgeest, M. Scolamiero, and A. Tamai.

References

[1] A. Lerario, P. Roos Hoefgeest, M. Scolamiero, A. Tamai, Testing the Variety Hypothesis, *arXiv preprint*, https://arxiv.org/abs/2507.16705.