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Dimension-expanding polynomials and the discretized Elekes-Rónyai theorem

I will present a recent result, joint with Josh Zahl, asserting that most real bivariate polynomials are "dimension expanding" when applied to a Cartesian product. More concretely, if P is a polynomial that is not of the form $P(x,y) = h(a(x) + b(y))$ or $P(x,y) = h(a(x)b(y))$, then whenever A and B are Borel subsets of $\mathbb{R}$ with Hausdorff dimension $0 < \alpha < 1$, we have that $P(A,B)$ has Hausdorff dimension at least $\alpha + \varepsilon$ for some $\varepsilon(\alpha) > 0$ that is independent of P. This is an analogue of Elekes-Rónyai theorem, which is concerned with the cardinality of $P(A \times B)$ for finite sets A, B.