Distance sets and a nonlinear version of Bourgain's projection theorem.

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Abstract

Bourgain's projection theorem is an extension of his celebrated discretized sum-product estimate that has found striking applications in many areas. I will discuss a generalization of the projection theorem from the family of linear projections to parametrized families satisfying a technical but mild condition. I will present some applications, particularly to the Falconer distance set problem. The proofs are based on applying the original version of the theorem to measures in a suitable multiscale decomposition, that I will describe if time allows.