

An extension of the Bourgain--Demeter--Guth decoupling theorem

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Decoupling estimates are an important tool in harmonic analysis with far-reaching applications in PDEs and number theory. The main idea is to take a function with frequencies near a curved manifold or a set with special arithmetic structure, and decompose the Fourier support into disjoint boxes to study the cancellation between the different frequency pieces caused by destructive interference.

The celebrated Bourgain--Demeter--Guth theorem 'decouples' functions with frequencies near a non-degenerate curve. The theorem (which is purely harmonic analytic) has an interesting application in number theory: it gives a sharp bound on the number of solutions to the Vinogradov system. In this talk, we will discuss an extension of their result in the plane by removing the non-degeneracy condition.