

Additive Combinatorics
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Linear equations in primes

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Abstract

Let s be a positive integer. I will introduce two conjectures, the Gowers Inverse Conjecture $GI(s)$ and the Mobius Nilsequences Conjecture $MN(s)$. I will explain how, knowing these two conjectures, one may count the number of solutions in primes to rather general linear equations $Ax = b$, where A is an s by t integer matrix.

The $GI(1)$ and $MN(1)$ conjectures follow from classical results on the Hardy-Littlewood method. We have proved the $GI(2)$ and $MN(2)$ conjectures. This allows us to find, for example, and asymptotic for the number of 4-term progressions $p_1 < p_2 < p_3 < p_4 \leq N$ of primes.

Joint work with T. Tao.