

Correlations of multiplicative functions and applications

Lilian Matthiesen*

lilianma@kth.se

In the first part of this talk I will describe asymptotic results on linear correlations of the form $\sum_{n,d < x} h_1(n)h_2(n + d) \cdots h_{r+1}(n + rd)$ (and generalisations thereof) for multiplicative functions h_1, \dots, h_{r+1} . The proof of these results works with methods developed by Green and Tao in their work on primes and uses, amongst others, results stemming from Granville and Soundararajan's work on "pretentiousness."

The second part of the talk is about joint work with Daniel Loughran on the problem of counting the number of varieties in a given family which have a rational point. Building partly on the above-mentioned results about multiplicative functions, we obtain correct order lower bounds for this counting problem in suitable families over P^1 , and thereby answer a question of Serre.

*Department of Mathematics, KTH, Lindstedtsvägen 25, Stockholm, 100 44, SWEDEN