French-German Summer School
Galois Theory and Number Theory
Konstanz, July 18-24 2015

Arithmetic Statistics in Function Fields

Edva Roditty-Gershon (University of Bristol)

Abstract: I will discuss the mean square of sums of the generalised divisor function over arithmetic progressions for the rational function field over a finite field of q elements. In the limit as q tends to infinity we establish a relationship with a matrix integral over the unitary group, and analyse the integral. This is a joint work with Jon Keating, Brad Rodgers and Zeev Rudnick. I will also discuss the auto-correlations of arithmetic functions (in particular the generalised divisor function and the von Mangoldt function). Function field analogues of these problems have recently been resolved in the limit of large finite field size q. However, in this limit the correlations disappear: the arithmetic functions become uncorrelated. We compute averages of terms of lower order in q which detect correlations. Our results show that there is considerable cancellation in the averaging and have implications for the rate at which correlations disappear when q tends to infinity. This is a joint work with Jon Keating.