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The distribution of points on cyclic trigonal curves over finite fields

The study of the distribution of points on curves over finite fields has a long history. We will focus on a more recently studied aspect, namely we will look at a family of curves defined over a fixed finite field and let the genus increase. For hyperelliptic ensemble was studied by Kurlberg and Rudnick. Their approach was generalized to cyclic trigonal (and more generally cyclic ℓ -covers) by myself, David, Feigon and Lalin. But the limitations of the method did not allow us to obtain statistics for the whole moduli space of cyclic trigonal covers of given genus; we could only study certain irreducible components of the moduli space.

I will describe a different approach that permits one to look at the whole moduli space at the same time. This is achieved by relating trigonal cover of the projective line to cyclic function field extensions, and counting such extensions with prescribed ramification and splitting conditions at a finite number of primes. Time permitting; I will explain how to generalize the approach to higher degree covers. This is joint work with Chantal David, Brooke Feigon, Nathan Kaplan, Matilde Lalin, Ekin Ozman and Melanie Matchett Wood.