

DISTRIBUTION OF THE NUMBER OF POINTS ON CURVES OVER FINITE FIELDS: NEW RESULTS  
AND CONJECTURES

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In this talk, we will see how to go beyond Katz-Sarnak theory on the distribution of curves over finite fields according to their number of rational points. In particular, we present a formula for the limits of the moments measuring the asymmetry of this distribution for curves of genus  $g \geq 3$ . Then, with some experimental data, we will try to convince the audience that there may be a stronger notion of convergence than the one provided by the Katz–Sarnak framework for all curves of genus  $\geq 3$ . This was not observed before because for elliptic curves and for hyperelliptic curves of every genus, this stronger convergence cannot occur.

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