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On the distribution of the maximum of partial sums of exponential sums

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In analogy with multiplicative character sums, we investigate the distribution of the maximum of partial sums of various families of exponential sums. We obtain precise estimates on the distribution function in a large uniform range, in the case where the Fourier transforms of these exponential sums are real valued, and satisfy some "natural" hypotheses. Important examples include Birch sums and Kloostermann sums. The proof uses a blend of analytic and probabilistic techniques together with deep tools from algebraic geometry. As an application, we exhibit large values of partial sums of these exponential sums, which we believe are best possible. This is a joint work with Pascal Autissier and Dante Bonolis.

Summary

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