BOSTON UNIVERSITY NUMBER THEORY SEMINAR

Short character sums

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Monday, April 8 at 4:15 pm
111 Cummington Mall, MCS B21
Tea and cookies in MCS 144 at 4:00 pm

Abstract: A surprisingly diverse array of problems in analytic number theory have at their heart a problem of bounding (from above) an exponential sum, or its multiplicative cousin, a so-called character sum. For example, both understanding the Riemann zeta function or Dirichlet L-functions inside the critical strip, and also counting solutions to Diophantine equations via the circle method or power sieve methods, involve bounding such sums. In general, the sums of interest fall into one of two main regimes: complete sums or incomplete sums, with this latter regime including in particular "short sums." Short sums are particularly useful, and particularly resistant to almost all known methods. In this talk, we will see what makes a sum "short," sketch why it would be incredibly powerful to understand short sums, and discuss a curious proof from the 1950's which is still the best way we know to bound short sums. We will end by describing new work which extends the ideas of this curious proof to bound short sums in much more general situations.