BI-CO MATHEMATICS COLLOQUIUM

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"One level density for families of L-functions attached to elliptic curves"

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Talk at 4:00 – Park 338
Tea at 3:30 – Park 355, Math Lounge

Abstract:

The one-level density is about the behavior of low-lying zeroes of L-functions in families. Contrary to other statistics, such as the pair correlation, which are universal (i.e. the same for all L-functions), it is believed that the one-level density will differ depending on the "symmetry type" of the family (unitary, symplectic, orthogonal, even orthogonal and odd orthogonal). We study the one-level density for various families of L-functions attached to elliptic curves, using the ratios conjectures as introduced by Conrey, Farmer and Zirnbauer. From the (conjectural) closed formulas that we obtain, we can determine the underlying symmetry type of the families. This cannot always be done with the classical approach to the one-level density, via the explicit formulas, as results can only be achieved for test functions with Fourier transform of limited support, and the three orthogonal symmetry types are then undistinguishable. But this can be done with the ratio conjectures, with somehow surprising results, shedding more light on "independent" and "non-independent" zeroes and the repulsion phenomenon.

We will review all the relevant concepts from L-functions of elliptic curves and random matrix theory during the talk.

This is joint work with D.K. Huynh and J. Parks.

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