Philadelphia Area Number Theory Seminar

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Families of Galois groups and harmonic families of automorphic forms

Abstract: A number of questions in Galois theory can be phrased as follows: how "large" (in various senses) can the Galois group G of an extension of the rational numbers be, if the extension is only allowed to ramify at a "small" set of primes? If we assume that G is abelian, class field theory gives us a complete answer, but the question is open in almost every nonabelian case, because there is no known way to systematically and explicitly construct such extensions in full generality.

However, it turns out that if we shift our perspective slightly, we find a point where the problem's defense is weakest. While the question above is natural and the objects are familiar, we will see that to answer certain questions about the largeness of this Galois group, it seems necessary to use techniques involving automorphic forms and their representation-theoretic avatars. In particular, it will turn out that some recent results on harmonic families of automorphic forms (a notion we will explain) translate to the fact that such number fields, despite not being explicitly constructible by known methods, turn out to "exist in abundance" and allow us to find bounds on the sizes of such Galois groups.

Wednesday, June 21, 2017
2:40–4:00PM

Bryn Mawr College
Department of Mathematics
Park Science Center **328**
Tea and refreshments at 2:20PM in Park 355