Density results on the 2-part of class groups

Abstract:
We will discuss some new density results about the 2-primary part of class groups of quadratic number fields and how they fit into the framework of the Cohen-Lenstra heuristics. Let Cl(D) denote the class group of the quadratic number field of discriminant D. The first result is that the density of the set of prime numbers $p \equiv -1 \mod 4$ for which Cl($-8p$) has an element of order 16 is equal to $1/16$. This is the first density result about the 16-rank of class groups in a family of number fields. The second result is that in the set of fundamental discriminants of the form $-4pq$ (resp. $8pq$), where $p \equiv q \equiv 1 \mod 4$ are prime numbers and for which Cl($-4pq$) (resp. Cl($8pq$)) has 4-rank equal to 2, the subset of those discriminants for which Cl($-4pq$) (resp. Cl($8pq$)) has an element of order 8 has lower density at least $1/4$ (resp. $1/8$). We will briefly explain the ideas behind the proofs of these results and emphasize the role played by general bilinear sum estimates.

Note: The speaker will give a prep-talk for graduate students in AP&M 7421 at 1:15pm. All graduate students interested in number theory are strongly encouraged to attend.

Host: Cristian Popescu

Thursday, January 21, 2016
2:00 PM
AP&M 7421