Department of Mathematics,
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Department Colloquium

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Stark's Conjectures and Hilbert's 12th Problem

Abstract:

In this talk we will discuss two central problems in algebraic number theory and their interconnections: explicit class field theory and the special values of L-functions. The goal of explicit class field theory is to describe the abelian extensions of a ground number field via analytic means intrinsic to the ground field; this question lies at the core of Hilbert's 12th Problem. Meanwhile, there is an abundance of conjectures on the special values of L-functions at certain integer points. Of these, Stark's Conjecture has special relevance toward explicit class field theory. I will describe two recent joint results with Mahesh Kakde on these topics. The first is a proof of the Brumer-Stark conjecture. This conjecture states the existence of certain canonical elements in CM abelian extensions of totally real fields. The second is a proof of an exact formula for Brumer-Stark units that has been developed over the last 15 years. We show that these units together with other easily written explicit elements generate the maximal abelian extension of a totally real field, thereby giving a p-adic solution to the question of explicit class field theory for these fields.

Host: Cristian D. Popescu

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4:00 PM