COLLOQUIUM

DEPARTMENT OF MATHEMATICS AND STATISTICS
OAKLAND UNIVERSITY
ROCHESTER, MICHIGAN 48309

Artur Elezi
Department of Mathematics and Statistics
American University

Coding Theory and Riemann Hypothesis

Abstract

Generating functions for the number of solutions of systems of polynomial equations over finite fields are called local zeta functions. In 19th century, Weil formulated a few conjectures about these functions. He was able to prove them in the case of a single polynomial of two variables - a curve. The part of this theorem that is relevant for our talk states that the local zeta function of a curve over a finite field with q elements is a rational function of one variable T, and squares of its complex roots lie on a circle of radius $1/q$. If we substitute the -s power of q for T, the theorem states that the roots of the zeta function lie on the critical line $Re(s)=1/2$, which is a classical Riemann Hypothesis type of result.

In this talk, I will review some basics of classical coding theory and then introduce zeta functions of linear codes. An analogue of Riemann Hypothesis for linear codes and a discussion on the state of the conjecture will follow.

The talk will be self-contained, so most of it should be easily accessible for undergraduate students.

Tuesday, December 13, 2016
1:30 – 2:30 PM
Room 386 MSC

(Refreshments at 1-1:30 PM in the kitchen area adjacent to 368 MSC)