

THE MATHEMATICS DEPARTMENT PRESENTS

A MATHEMATICS COLLOQUIUM

MONDAY, February 5, 2007

BOND HALL 415

4:00 pm

Title: Volumes of Polynomials in Number Theory and Random Matrix Theory

Speaker: Christopher Sinclair, Pacific Institute for the Mathematical Sciences

Abstract: The Mahler measure of a polynomial is defined to be the absolute value of the product of its roots outside the unit circle times the absolute value of the leading coefficient. By a theorem of Kronecker, the Mahler measure of a polynomial with integer coefficients is equal to 1 if and only if the polynomial has all of its roots on the unit circle. Thus we may view the Mahler measure of a polynomial with integer coefficients as a measure of ‘cyclotomicness.’ An unsolved question of D.H. Lehmer from 1933 asks whether the set of Mahler measure of integer polynomials has a limit point at 1. This question has inspired interest in other properties of the set of Mahler measures of integer polynomials. In this talk I will show how certain questions about the set of Mahler measures can be answered by computing the volumes of coefficient vectors of polynomials with real and complex coefficients. Next I will demonstrate a connection between these volumes of polynomials and certain ensembles of random matrices, and how these volume calculations lead to new methods in the study of these ensembles.

Refreshments will precede the talk at 3:30pm in Bond Hall 300.