BI-CO MATHEMATICS COLLOQUIUM

Jonathan Hanke

"Quadratic Forms in Number Theory"

Monday, September 15, 2014

Talk at 4:00 – Park 338
Tea at 3:30 – Park 355, Math Lounge

Abstract:
In the last decade there has been a renewed interest in studying classical questions about quadratic forms in number theory. For example, questions like "In how many ways can we write a number as a sum of four squares?" and "How many inequivalent quadratic forms are there with a given determinant?" This interest came from several fronts -- Conway's conjectures about certain finiteness theorems for quadratic forms (e.g. "How to simply characterize definite quadratic forms representing all positive integers?") and Bhargava's interesting arithmetic parameterizations of classical structures in number theory by quadratic forms.

In this talk we give an overview of some historical themes in the arithmetic of quadratic forms, focusing on representation questions and class numbers, describe the analytic theory of quadratic forms, and see how these can be combined (with some serious computational effort) to give complete answers to some of these questions. We will also outline some of the many open questions remaining in this beautiful and rich subject.

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