Quadratic Forms and the 290 Theorem

Math 290B

Weds, 6-8PM, MS 6118

For the forseeable future, we're going to run a participating seminar on quadratic forms. One of our goals will be to prove the following recent theorem of Bhargava and Hanke:

Theorem. *Let Q be a positive definite quadratic form with integer coefficients. Then Q represents every integer if and only if it represents the integers up to 290.*

The proof of this theorem uses a little bit from both the algebraic and analytic theories of quadratic forms. So the rough goal of our seminar will be as follows: in the first 6-7 weeks, discuss the algebraic theory, developing a bit more than is strictly necessary for the B-H paper. After that, start specifically picking out the bits and pieces needed for B-H, and then prove the theorem. After that, there are two or three directions we could take, based on what those still around are interested in:

- Quadratic forms over function fields
- Bhargava also has several papers on higher composition laws. It might be valuable to look at these, and see how they relate to other topics we're interested in.
- Computational aspects of anything we've run into.

We're going to meet on Oct 4 for purely organizational purposes, and then will continue to meet weekly starting Oct 18. If you have any questions, come find Craig Citro or Nathan Ryan and ask.