CHELLURI LECTURE

A special Oliver Club offered in memory of Raju Chelluri

Akshay Venkatesh, Stanford University

From Continued Fractions to Modular Forms

The continued fraction

$$\sqrt{2012} = 44 + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{1 + \cfrac{1}{10 + \cdots}}}}$$

begins with the digits 44, 1, 5, 1, 10, ... Eventually, these digits begin to repeat themselves.

If we take the square root of a large integer, what should we expect about these digits? How likely are we to see four ones followed by a nine, for example? This question turns out to be related to a fundamental problem in the theory of integral quadratic forms; it can be analyzed using the theory of modular forms, or in terms of the geodesic flow on a certain Riemannian surface. I will review some of the mathematics around this question, and some of the different approaches to it — for example, the works of Linnik, Duke, and Chelluri.

Following the lecture, a musical performance and reception will be held at A. D. White House.

Thursday, April 19, 2012 at 4:30 PM in 251 Malott Hall