Discrete Mathematics Seminar

Time: Friday, 8 February 2013, 1:00-2:00 PM
Room: 238 Derrick Hall
Title: New Result on Extremal Bases for Finite Cyclic Groups
Speaker: Dr. Jian Shen, Mathematics Department

Abstract:

For positive integers d and k, let m(d,k) be the maximum positive integer m such that there exists a set A of k integers such that every integer is congruent to a sum of at most d elements of A modulo m. It is easy to see that m(d,1)=d+1 and m(1,k)=k+1. However, the computation of m(d,k) in general is unexpectedly complex. It is still an open problem to have an exact formula for m(2,k). In 1978, Mrose proved that $m(2,k) > 2k^2/7 + O(k) \approx 0.2857k^2 + O(k)$. In 2012 a group of REU students (Bolcher, Hampton, and Linden under the supervision of Dr. Xingde Jia) proved that $m(2,k) > 37k^2/121 + O(k) \approx 0.3057k^2 + O(k)$.

In this talk, we will further push the lower bound to $m(2,k) > (1-\varepsilon)k^2/3 + O(k)$ for any positive real ε. This is joint work with Dr. Xingde Jia.