Algebra and Number Theory Seminar

Title: Kloosterman–Like Sums with Moebius Inversion

Speaker: Faruk Goeloglu

Date: Mon 25th January 2010 at 4:00PM

Location: Mathematical Sciences Seminar Room

Abstract: We give divisibility results on Kloosterman-like sums using Numerical Normal Form (NNF). A Kloosterman sum $K_n(a)$ is an exponential sum related to the Walsh transform $W_f(a)$ of the inverse function $f = x^{-1}$ on $GF(2^n)$, which is of degree $n - 1$. Helleseth and Zinoviev proved that $K_n(a)$ is divisible by 8 if and only if a is in Trace-0-hyperplane. We can use the NNF, a Moebius inversion of a Boolean function, to give a purely combinatorial proof that any Boolean function f with degree $n - 1$ satisfies $W_f(a)$ is divisible by 8 if and only if a is in some fixed hyperplane.