
CHI HOI YIP, University of British Columbia

Gauss sums and the maximum cliques in generalized Paley graphs of square order

Let $GP(q, d)$ be the d -Paley graph defined on the finite field \mathbb{F}_q . It is notoriously difficult to improve the trivial upper bound \sqrt{q} on the clique number of $GP(q, d)$. In this talk, we will investigate the connection between Gauss sums over a finite field and maximum cliques of their corresponding generalized Paley graphs. In particular, we show that the trivial upper bound on the clique number of $GP(q, d)$ attains if and only if $d \mid (\sqrt{q} + 1)$, which strengthens the previous related results by Broere-Döman-Ridley and Schneider-Silva, as well as improves the trivial upper bound on the clique number of $GP(q, d)$ when $d \nmid (\sqrt{q} + 1)$.