



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

Permutation Pentanomials of the form $x^r H(x^{q-1})$ over F_{q^2}

By

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Abstract

Let p be a prime and $q = p^t$ for a positive integer t . A polynomial $f(x) \in F_q[x]$ is defined as a permutation polynomial (PP) if the associated mapping $a \mapsto f(a)$ from F_q into F_q is a bijection. The study of permutation polynomials is crucial due to their extensive applications in cryptography, coding theory, and combinatorial design theory. This research aims to identify permutation polynomials that exhibit a simple form, specifically those with a minimal number of terms. We focus on polynomials of the form $x^r H\left(x^{\frac{q-1}{d}}\right)$ over F_q where r and d are non-negative integers and $d \mid q-1$, which represent a large family of permutation polynomials with simple algebraic expressions.

The characterization of permutation polynomials of the form $x^r H(x^{q-1})$ over F_{q^2} has been the subject of numerous papers. In this talk, I will present several families of permutation polynomials of the form $x^r H(x^{q-1})$ with five terms over F_{q^2} . Some of these constructions not only yield new characterizations of permutation pentanomials but also provide a more straightforward approach to some of the previously known families of permutation pentanomials.

Date : 29 November 2024 (Friday)

Time : 10:00am

Venue : Room 1410 (near Lifts 25/26)

All are Welcome!