



The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Pure Mathematics

**Characterization of Intersecting Families of Maximum
Size in $PSL(2, q)$**

By

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(Joint work with Ling Long, Rafael Plaza, and Peter Sin)

Abstract

The Erdős-Ko-Rado (EKR) theorem is a classical result in extremal set theory. It states that when $k < n/2$, any family of k -subsets of an n -set X , with the property that any two subsets in the family have nonempty intersection, has size at most $\binom{n-1}{k-1}$; equality holds if and only if the family consists of all k -subsets of X containing a fixed point.

Here we consider EKR type problems for permutation groups. In particular, we focus on the action of the 2-dimensional projective special linear group $PSL(2, q)$ on the projective line $PG(1, q)$ over the finite field \mathbb{F}_q , where q is an odd prime power. A subset S of $PSL(2, q)$ is said to be an *intersecting family* if for any $g_1, g_2 \in S$, there exists an element $x \in PG(1, q)$ such that $x^{g_1} = x^{g_2}$. It is known that the maximum size of an intersecting family in $PSL(2, q)$ is $q(q-1)/2$. We prove that all intersecting families of maximum size are cosets of point stabilizers for all odd prime powers $q > 3$.

Date: Wednesday, 11 April 2018

Time: 5:00p.m. - 6:00p.m.

**Venue: Room 5510, Academic Building
(near Lifts 25 & 26), HKUST**

All are welcome!