

Mutually Orthogonal Latin Squares based on e-Klenian polynomials

Jaime Gutierrez, University of Cantabria, Spain

A latin square of order t is an $t \times t$ matrix containing t distinct symbols such that each symbol appears in each row and column exactly once. Latin squares have various applications in Coding Theory, Cryptography, Finite Geometries and in the design of statistical experiments, to name a few. Every Latin square of prime or prime power order q corresponds to a polynomial in 2 variables over the finite field of q elements, called the local permutation polynomial. Two latin squares of the same order are said to be mutually orthogonal if you get t^2 distinct ordered pairs when you superimpose them. In this paper we investigate sets of mutually orthogonal latin squares (MOLS) of order q generated by local permutation polynomials over finite fields. After introducing symmetric permutation subgroups without fixed points, we provide a family of MOLS of order q associated the so called e-Klenian polynomials.

Keywords: Permutation multivariate polynomials, Finite fields, Latin squares. MOLS.