THE GEOMETRICAL STRUCTURE OF
A COMPLEXIFIED COMPLETE SET OF
PAIRWISE ORTHOGONAL LATIN SQUARES

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Abstract
In this paper, the complexification of a Latin square, a complexified set of pairwise orthogonal Latin squares of complex order \( n \), and the complexified complete set are defined. In addition, the complexified projective plane corresponding to the complete set of pairwise orthogonal Latin squares of complex order 2 is obtained.

Keywords: Latin square, Projective plane, Complexification.


1. Introduction
A Latin square of side \( n \) is an arrangement of \( n \) symbols into \( n^2 \) sub-squares of a square in such a way that every row and every column contains each symbol exactly once.

Two Latin squares are orthogonal if when one is superimposed upon the other, every ordered pair of symbols occurs exactly once in the resulting square. The number \( n \) is known as the order of the Latin square.

A Latin square is said to be in standard form if the symbols in the first row are in natural order. Orthogonal Latin squares are assumed to have this property (Raghavarao, [4]).

If in a set of Latin squares every pair is orthogonal, the set is called a set of pairwise orthogonal Latin squares (POLS).

A set of pairwise orthogonal Latin squares (POLS) of order \( n \) has at most \( n^2 - 1 \) members. It is called a complete set if it has exactly \( n - 1 \) members.

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