

# 1-factorizations of the loopy complete graph and a new sense of orthogonality for symmetric Latin squares

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(based on a joint work with Trent G. Marbach)

A Latin square of order  $n$  is an  $n \times n$  array of  $n$  symbols such that each symbol occurs exactly once in each row and column. Latin squares can be used to represent a variety of graph-based structures, such as 1-factorizations of complete bipartite graphs or simply, directed and undirected graphs. We study the representation of symmetric Latin squares as the 1-factorizations of the complete graph with loops.

Motivated by problems on the existence of sets of mutually orthogonal Latin squares, we use this representation to study decompositions of Latin squares into transversal-like structures and define a new sense of orthogonality for symmetric Latin squares.