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Near transversals in group-based latin squares

Latin squares (of order n) are $n \times n$ arrays in which each row and each column is a permutation of the integers $[0, n-1]$. We say a latin square L is group-based if it is possible to order the elements of a group $G = \{g_0, g_1, \ldots, g_{n-1}\}$ so that $L_{i,j} = k$ if and only if $g_i \cdot g_j = g_k$.

A famous conjecture, variously attributed to Ryser, Brualdi, and Stein, asserts that in every latin square of order n it is possible to find a collection of $n-1$ cells which intersects each row and column, and contains each symbol, at most once—such a collection of cells is known as a near transversal. In this talk we will outline the proof that group-based latin squares satisfy the Ryser-Brualdi-Stein conjecture. We will then explain why the resolution of this special case is far from the end of the discussion of near transversals in group-based latin squares.