Mutually Orthogonal Factor-Pair Latin Squares

James Hammer, Cedar Crest College and John Lorch*, Ball State University

A factor-pair latin square of order n is a latin square of order n such that for each pair of positive integers a, b with $ab = n$, every symbol appears exactly once in each of the canonical $a \times b$ regions that tile the square. Another way to say this is that a factor-pair latin square of order n is an (a, b)-sudoku latin square for every pair of positive integers a, b satisfying $ab = n$. We introduce a linear-algebraic method of producing factor-pair latin squares in prime-power orders and construct mutually orthogonal collections of such squares.

Keywords: factor-pair latin square, sudoku latin square, orthogonal latin squares