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Balanced Equi- n -squares

In this presentation, we present recent work undertaken to understand d -balanced equi- n -squares. With the requirement that d is a divisor of n , these structures are $n \times n$ matrices containing symbols from \mathbb{Z}_n in which any symbol that occurs in a row or column, occurs exactly d times in that row or column. There are connections with Latin square of order n that decompose into $d \times (n/d)$ subrectangles, which we exploit to construct d -balanced equi- n -squares. We also show connections with α -labellings of graphs, which enables us to both construct new d -balanced equi- n -squares and construct new α -labellings of graphs.