Embedding partial Latin squares into Latin squares with many mutually orthogonal mates

E. Şule Yazıcı

KOÇ UNIVERSITY

(Joint work with D. M. Donovan and M. J. Grannell)

Abstract

In 1960 Evans [2] proved that a partial Latin square of order n can always be embedded in some Latin square of order t for every $t \geq 2n$. In the same paper Evans asked if a pair of finite partial Latin squares which are orthogonal can be embedded in a pair of finite orthogonal Latin squares. It is known, that a pair of orthogonal Latin squares of order n can be embedded in a pair of orthogonal Latin squares of order t if $t \geq 3n$, the bound of $3n$ being best possible. Jenkins [3], considered embedding a single partial Latin square in a Latin square which has an orthogonal mate. His embedding was of order t^2. Recently the first constructive polynomial embedding result for a pair of orthogonal partial Latin squares is given in [1]. In this presentation we will generalize the work of [3] and show that any partial Latin square can be embedded in a Latin square which has many orthogonal mates (not just one) that are mutually orthogonal.

Keywords: Embeddings of Partial Latin Squares
MSC: 05B15

References

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