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Space-filling Latin Hypercube Designs based on Randomization Restrictions in Factorial Experiments

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Latin hypercube designs (LHDs) with space-filling properties are widely used for emulating computer simulators. Over the last three decades, a wide spectrum of LHDs have been proposed with space-filling criteria like minimum correlation among factors, maximin interpoint distance, and orthogonality among the factors via orthogonal arrays (OAs). Projective geometric structures like spreads, covers and stars of PG(p-1,q) can be used to characterize the randomization restriction of multistage factorial experiments. These geometric structures can also be used for constructing OAs and nearly OAs (NOAs). In this paper, we present a new class of space-filling LHDs based on NOAs derived from stars of PG(p-1,2).

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