Construction of Nested Orthogonal Arrays of Parallel-Flats Type

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Abstract

Recently, nested orthogonal arrays receive notable attention as stepping stones for planning computer simulations with variable levels of accuracy. In this talk, a new class of nested orthogonal arrays, called the nested orthogonal arrays of parallel-flats type, is introduced for addressing this new design issue. The sufficient and necessary condition for design construction is proposed, and a new class of nested orthogonal arrays is explicitly characterized. In addition, a heuristic algorithm is developed for systematically generating the proposed designs. The proposed algorithm is able to generate a nested orthogonal array whose order is not necessarily equal to a power of prime. This allows an investigator to plan a series of multi-fidelity computer simulations with a more flexible run-size.

Key words: Computer experiment; Galois field; Orthogonal array; Parallel-flats design; Space-filling design.