Geometric Orthogonal Arrays: A New Class of Space-filling Designs Stratifying on Grids of Various Dimensions

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Abstract

Computer experiments are powerful tools routinely used in many scientific investigations, and space-filling designs are suitable for computer experiments. In this talk, I will introduce a new class of space-filling designs, called geometric orthogonal arrays, that are space-filling in terms of the stratification properties. Using the finite field techniques, we develop an efficient algorithm to label the levels of a regular design (of a prime power level) with integers, such that the labeled design stratify on a series of grids. Unlike most existing methods, ours can deal with the design uniformity in many projected spaces of various dimensions, and is effective for large designs. Construction results are summarized for practical use.