Dual-Orthogonal Arrays for Order-of-Addition

Two-Level Factorial Experiments

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Abstract

In some industrial, chemical and biopharmaceutical studies, varying component addition orders and component levels may have a significant impact on the responses. In this talk, I will introduce a new class of orthogonal arrays called dual-orthogonal arrays to design order-of-addition two-level factorial experiments in which both component addition orders and component levels can be varied over treatments. Dual-orthogonal arrays can be viewed as an optimal combination of order-of-addition orthogonal arrays and two-level orthogonal arrays. Based on these two different concepts of orthogonality, both pairwise order effects and component main effects can be estimated with optimal efficiency. Under the assumption of normality, these two kinds of parametric effects can also be inferred independently. A real-world example will be used to show that dual-orthogonal arrays can be practical. In addition, some construction methods will be introduced to generate dual-orthogonal arrays.