# Introduce to the Count Function and Its Applications

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## Abstract

The count function has been applied to the studies of factorial designs, such as the minimum aberrations, optimal designs and uniformity patterns. This presentation will introduce the basic properties of the count function and its current developments. Two of its applications will be focused on. The first is the isomorphism examination, witch compares whether two designs have the same structure subject to some row and column operations. The split-count matrix was developed for initial screening the isomorphism. It has been theoretically proved that the split-count matrix provides a more efficient examination than some existing methods. The second application is the design enumeration, which is considered to completely generate certain types of designs, such as regular designs or orthogonal arrays. An assembly method based on the count function and projection was proposed to sequentially generate all non-isomorphic two-level designs by a hierarchical structure.