

INNER BALANCE OF DESIGNS

TOMAS NILSON

A *combinatorial design* is often defined as a pair (X, \mathcal{B}) where X is a set (of elements called points) and \mathcal{B} a collection of subsets (called blocks) of X . Such a design has two constraints, the points and the blocks. The most important example is *balanced incomplete block designs* (BIBD).

A *row-column design* has three constraints, rows, columns and symbols. One example is Latin squares. However, a Latin square is an expensive design since every row is incident with every element and so on. So there is need for row-column designs which are not complete in that sense, but still have strong properties. These designs often carry one or two BIBDs as substructures, and one such example is *triple arrays*.

We will take a walk through design theory up to the special area of inner balance which can be defined as follows: “A row-column design is balanced for intersection (or inner balanced) if the row-column intersections form a balanced incomplete block design”. McSorley et al. (2005) found one such example, a triple array and asked if there are any more.