

ABSTRACT

Several mathematical studies have been carried out to help solve specific problems pertaining to the construction and analysis of Balanced Incomplete Block designs in terms of application. Most of these studies are centered at variation in the number of groups, block sizes and the pair of distinct treatments within the same group λ . Although most of the construction methods have been introduced to build the elements of designs for specific parameters, with different techniques suggested for testing their existence, no general technique for determining the existence of these designs has been realized. There is no existing algorithm on the sum construction method of Automorphic Symmetric Balanced Incomplete Block Designs. The main objective of this study is to perform sum construction of Automorphic Symmetric Balanced Incomplete Block Designs alongside developing an algorithm, establishing the existence and determining the efficiency of sum constructed Automorphic Symmetric Balanced Incomplete Block Designs. A method of Classical Analysis of variance has been employed in the determination of relative efficiency of the sum constructed Designs and a discussion on practical application of such designs is presented based on the generated analysis of variance tables. The findings reveal that a sum constructed design has a higher number of significant variables hence more efficient with a relative efficiency of 1.216 when compared with the parent design. This study enriches the area of experimental design by providing techniques used in selection of blocks and contributes to the academic world by introducing an algorithm for sum construction of Automorphic Symmetric Balanced Incomplete Block Designs.