

Some properties of information matrices of complete designs under an interference model

Katarzyna Filipiak¹ and Rafał Róžański²

¹*Agricultural University of Poznań, Poland*

²*The Higher Vocational State School in Gorzów Wielkopolski, Poland*

Abstract

We consider an experiment with fixed number of blocks, in which a response to a treatment can be affected by treatments from neighboring units. For such experiment the interference model with neighbor effects can be used. Under this model we study some properties of information matrices of complete block designs, according to connectedness and optimality of designs. Assuming the circular interference model with left-neighbor effects we give the necessary and sufficient conditions of connectedness of complete block designs with arbitrary, fixed number of blocks.

It is known that circular neighbor balanced designs (CNBD) are universally optimal in a circular interference model. However, CNBDs cannot exist for each combination of design parameters. In such a situation, only optimality with respect to the specified optimality criteria can be studied. Our aim is to characterize E-optimal allocation of treatments in blocks with respect to the number of blocks under the interference model with left-neighbor effects. For the CNBD extended and abridged by one certain block, the resulting structure is proved E-optimal.

Keywords

Information matrix, Interference model, Circular design, Optimality, Connectedness.