Connected and E-optimal designs under an interference model

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Abstract

We consider circular block designs with the same number of treatments and experimental units per block. Since we assume that a response to a treatment can be affected by treatments from neighboring units, we use the interference model with neighbor effects. We present sufficient and necessary conditions for connectedness of a design with a circulant neighboring matrix and necessary condition only otherwise. 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. Therefore we consider E-optimality of designs. We present the set of binary connected designs containing E-optimal design. We identify E-optimal designs in a case when the number of blocks is equal to t or $t-2$, where t is the number of treatments and the size of blocks. Next we show its E-optimality over the class of all designs. At the end we give the methods of construction and some examples of the E-optimal block designs.

Keywords

Information matrix, Connected design, E-optimal design, Eigenvalues.

References

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