

Optimal designs for nonlinear model with random block effects are systematically studied. For a large class of nonlinear models, we prove that any optimal design can be based on some simple structures. We further derive the corresponding general equivalence theorem. This result allows us to propose an efficient algorithm of deriving specific optimal designs. The application of the algorithm is demonstrated through deriving a variety of locally optimal designs and accessing their robustness under different nonlinear models.

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