THE UNIVERSITY OF GEORGIA
DEPARTMENT OF STATISTICS
Colloquium Series

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3:30pm in room 102, Caldwell Hall

D-Optimal Designs for Multinomial Logistic Models

We consider optimal designs for general multinomial logistic models, which cover baseline-category, cumulative, adjacent-categories, and continuation-ratio logit models, with proportional odds, non-proportional odds, or partial proportional odds assumption. We derive the corresponding Fisher information matrices in three different forms to facilitate their calculations, determine the conditions for their positive definiteness, and search for optimal designs. We conclude that, unlike the designs for binary responses, a feasible design for a multinomial logistic model may contain less experimental settings than parameters, which is of practical significance. We also conclude that even for a minimally supported design, a uniform allocation, which is typically used in practice, is not optimal in general for a multinomial logistic model. We develop efficient algorithms for searching D-optimal designs. Using examples based on real experiments, we show that the efficiency of an experiment can be significantly improved if our designs are adopted.