On the Range of the Covariance Function of Trinomial Data with Overdispersion

Yuichi Magara

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Yuichi Magara

Department of Mathematical Engineering and Information Physics,

Faculty of Engineering, University of Tokyo

7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan

magara@stat.t.u-tokyo.ac.jp

SUMMARY

In many situations we encounter multinomial data which exhibit overdispersion. To deal with these data, the Dirichlet-multinomial distribution or the quasi-likelihood method based on this distribution has been often used. However, the limitations of these models have been pointed out since they use only one parameter to represent within-block correlations. In this paper we focus on the trinomial case and show the range of the covariance function of trinomial data on the assumption that the response probabilities vary from block to block according to an arbitrary distribution. The proposed model is illustrated by application to real data in a developmental toxicity experiment.

Keywords: Developmental toxicity experiment; Dirichlet-multinomial distribution; Litter effect; Overdispersion; Quasi-likelihood