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Minimum Distance Estimators in Logistic Regression under Complex Designs

Topic 2 – Learning more from what we already know

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Introduction

In this paper, we consider the multinomial logistic regression model with complex survey and we shall introduce for this model the minimum phi-divergence estimator for the regressions coefficients, deriving its asymptotic distribution. As a particular case, we shall obtain the asymptotic distribution of the maximum likelihood estimator. This way of obtaining the asymptotic distribution of the maximum likelihood estimator is completely different from the approach presented by Binder (1983) or the approach based on Proposition 1 in Dale (1986).

The numerical example and the simulation study propose new estimators for the parameter of the logistic regression with overdispersed multinomial distributions for the response variables, the pseudo minimum Cressie-Read divergence estimators, as well as new estimators for the intra-cluster correlation coefficient.

The simulation study shows that the Binder's method for the intra-cluster correlation coefficient exhibits an excellent performance when the pseudo minimum Cressie-Read divergence estimator, with $\lambda=(2/3)$, is plugged.