



A bias-correction in Rotnitzky-Jewell criteria for improving the approach of correlation structure selection in generalized estimating equations

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In generalized estimating equations (GEE), the correlation between the repeated observations on a subject is modeled with a patterned working correlation matrix. Specifying the working correlation structure correctly is gainful, in terms of improving efficiency and enhancing scientific understanding. For analyzing cluster correlated data such as longitudinal data, a number of criteria are available in the literature for selecting an appropriate working correlation structure in GEE. The Rotnitzky-Jewell (RJ) criteria, which we have considered in this paper based on their good performance, are based on the fact that if the assumed working correlation structure is correct then the model-based (naive) and the sandwich (robust) covariance estimators of the regression coefficient estimates should be close to each other. In this paper, we propose a set of new criteria modifying the RJ criteria based on the bias-corrected sandwich covariance estimator, and show a comparison between the proposed criteria and the RJ criteria via a simulation study using correlated binary response. The results revealed that the proposed bias correction approach brings improvement in the RJ criteria in terms of improving the percentage selection of the correct correlation structure.

Keywords: bias-corrected sandwich covariance estimator; longitudinal data; model-based covariance estimator; working correlation structure.