

Extended GEEs with Random Effects in Longitudinal Studies

Chao Huang, Jianxin Pan

¹*School of Mathematics, University of Manchester, Manchester, UK*

Abstract

Recently, Generalized Estimating Equations (GEEs) have been extensively and well used in the longitudinal data analysis, especially after being cooperated with Modified Cholesky Decomposition (MCD) and Joint Modelling methods. These methods have shown both good improvement in the analysis part and persuasive consistent properties in the theoretical part.

But the diversity in different subjects has not been taken into account which does exist in the longitudinal data. In this paper, we utilize the random effects as part of the parameters both in the mean and in the covariance. We only make the assumption of existence for the first four order moment of the response data and include the random effects as a kind of penalty in the GEEs. The iterative methods are used for the estimation of the parameters. Real data analysis (cattle data) and simulation results shows competitive improvement.

Key words and phrases: Generalized estimating equation, joint modelling, Cholesky decomposition, random effects