

Regression Analysis for Semi-Competing Risks Data

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Abstract

Semi-competing risks data are commonly seen in biomedical applications in which a terminal event censors a non-terminal event. Possible dependent censoring complicates statistical analysis. We consider regression analysis based on a non-terminal event, say disease progression, which is subject to censoring by death. The proposed methodology is developed for discrete covariates under two types of assumptions. First, separate copula models are assumed for each covariate group and then a flexible regression model is imposed on the progression time which is of major interest. Model checking procedures are also proposed to help choosing a best-fitted model. Under a two-sample setting, Lin et al. (1996) proposed a competing method which requires making additional marginal assumption on the terminal event and implicitly assumes that the dependence structures in the two groups are the same. Using simulations, we compare the two approaches based on their finite-sample performances and robustness properties under model mis-specification. The proposed method is applied to a data set of bone marrow transplant provided in Klein and Moeschberger (2003).

Key words: Dependent censoring; Multiple events data; Transformation model; Copula model; Model selection.