Semiparametric Regression Analysis of Bivariate Gap Time for Semicompeting risks Data

Chia-Hui Huang

National Taipei University, Taipei, Taiwan

Abstract

When a disease progression is assumed to go through several states, researchers might be concerned with the duration or gap times between successive events (states) and would like to study the covariates effect across different durations. A general framework based on the multistate illness-death processes and mixture model is proposed to analyze the bivariate gap time distributions for semicompeting risks data. It is assumed that a population with two subgroups that follow the illness-death models while the group status is not fully observed. The proposed model provides an explicit and stochastic process to access the covariate effect as well as the association parameter between the bivariate gap times. Large sample properties are established through the maximum likelihood estimation equation and martingale score processes. Simulation results illustrate the performance of the proposed model and an application to a clinical study of acute lymphoid leukemia subjects after bone marrow transplantation is reported.

Key words: Illness-death model, Martingale processes, Mixture model, Semicompeting risks data