

Public Abstract

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Title:STATISTICAL ANALYSIS FOR SURVIVAL DATA WITH MISSING INFORMATION

In survival analysis, the random variables of interest are the times to events. The occurrence of an event is referred to as a failure. In practical problems some information about the failure time might be missing. Due to the different structures, missing information can be classified into two types. The first type is caused by the censoring scheme. For example, in AIDS or cancer studies, the failure time is often not observed directly, but only known to lie within an interval. This may happen when a subject misses one or more visits in a medical study with periodic follow-ups. The other type is caused by sampling structure. The items may not have the same probabilities to be selected. This dissertation discusses the survival analysis with missing information, it contains three parts. The first part discusses efficient estimation for the linear transformation models with current status data. We derive the maximum likelihood estimates and their information bound and establish the efficiency of the estimates. The second part considers efficient estimation for the proportional odds model with bivariate current status data. We develop an efficient estimator for the situations that the marginal distributions of the failure times follow the proportional odds models with joint survival function given by the copula model. The last part studies the biased sample problem with empirical likelihood method. The likelihood ratio statistic for this problem is proved to follow a chi-square distribution asymptotically. Simulation studies show that all the presented methods work well for practical use.