

STATISTICAL ANALYSIS FOR SURVIVAL DATA WITH MISSING INFORMATION

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ABSTRACT

As a branch of statistics, survival analysis, which is often referred to as “reliability theory” in engineering, has a long history. While in practical problems, some information might be missing. This dissertation discusses two types of missing information. The first type is caused by the censoring scheme, for example, the current status data. Several semiparametric models, e.g. the transformation models and the proportional odds models, are applied to the univariate and bivariate current status data. Efficient estimates are derived and the large sample properties of the estimates are provided. The other type is caused by sampling structure. It happens when the individuals do not have the same probabilities to be selected, for example, the stratified sampling. A biased sample problem is considered with the parameter of interest defined by some unbiased estimating equations. For the analysis, empirical likelihood approach is used and the likelihood ratio statistic is proved to follow a chi-square distribution asymptotically. Simulation studies and real data analysis are conducted to indicate that the presented approaches perform well in practical problems.