Public Abstract

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Title:Nonparametric Analysis of Interval-Censored Failure Time Data

This thesis considers the problem of treatment comparisons when only interval-censored failure time data are available. This type of data occurs frequently in clinical trials and other follow-up studies. We study several nonparametric procedures developed previously and compare them under different situations. In particular, we study the situation where the difference between the groups occurs at an early or late time period. For this problem, we generalize the log-rank tests developed for interval-censored data in Zhao and Sun (2004) and the weighted log-rank test presented in Kalbfleisch (2002). Numerical studies are conducted to evaluate the proposed test and compare it with the unweighted log-rank test, which indicate that the proposed method works well.

This thesis also considerers the problem of finding an appropriate sample size to achieve a desired power. We present a simple-to-use formula to find the sample size for a prespecified power and level of significance for the case of interval-censored data.

Since many researchers use missing data techniques such as imputation along with right censored methods to analyze interval-censored data, we also compare an imputed Kaplan-Meier Estimate of the survival function to Turnbull's Self Consistent Estimate. We present a large numerical study to show that these estimates often disagree at late time points when the mean survival time is large.