

Rank regression for modeling bus dwell time in the presence of censored observations

ABSTRACT

Bus dwell time estimation is very important for public transport planners and bus operators. Modeling bus dwell time is challenging, both theoretically and computationally, in the presence of censored observations. Common linear regression models are parametric models that involve assumptions that are difficult to satisfy in applications. Rank regression based on the accelerated failure time model is a semiparametric model that does not involve assumptions about the model variables or the model error terms. Hence, this paper proposes rank estimators for modeling bus dwell time on the basis of Gehan and log-rank weight functions. An iterative algorithm is introduced that involves a monotone estimating function of the model parameter, and its minimization is a computationally simple optimization problem. A resampling technique is used for estimating the distribution of the rank estimator through its empirical distribution. The proposed methodology is performed on a real data set to assess the efficiency of the rank estimators in applications. The results illustrate that the proposed parameter estimators are fairly unbiased and censored observations do not significantly impact the performance of the rank estimators

Keyword : Bus dwell time; Rank regression; Censored data; Accelerated failure time model