

Semiparametric Estimation of Single-Index Transition Intensities

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Analysis of duration data is often centered around the conditional hazard function of a survival time Y given a set of covariates X . In case of multiple destinations (or competing risks), focus is on state-specific transition intensities, $hs(y/x)$. Since right-censoring can be thought of as a separate state, methods developed for data with multiple destinations apply to right-censored single-destination data as well.

Several nonparametric estimators of $hs(y/x)$ have been proposed in the literature, but because of the "curse of dimensionality" problem they are rarely used in practice. Assuming that $hs(y/x)$ depends on x only through an index $x'\beta_s$, this research proposes a two-stage kernel estimator of $hs(y/x)$, where the first stage consists of estimating β_s and the second of estimating $hs(y/x)$ given the estimated index.

In the case of uncensored single-destination data or right-censored data where the censoring mechanism is independent of x , existing estimators of index coefficients can be used in the first stage. Currently the literature contains no semiparametric estimators for multiple-destination data. The first part of this research fills this gap by extending the idea of average derivative estimation. The asymptotic distribution is derived, and the new estimator is root- n consistent.

Since right-censored single-destination data where the censoring mechanism depends on the covariates is a special case, the new estimator of β_s can also be used in the first stage of Horowitz and Gorgens' semiparametric estimator of the censored transformation (GAFT) model and Horowitz's semiparametric estimator of the mixed proportional hazards model.

JEL Classification numbers: C14, C24, C41

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