



Semiparametric transformation models for survival data with dependent censoring

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Abstract

This paper proposes copula based semiparametric transformation models to take dependent censoring into account. The model is based on a parametric Archimedean copula model for the relation between the survival time (T_1) and the censoring time (T_2), whereas the marginal distributions of T_1 and T_2 follow a semiparametric transformation model. We show that this flexible model is identified based on the distribution of the observable variables, and propose estimators of the nonparametric functions and the finite dimensional parameters. An estimation algorithm is provided for implementing the new method. We establish the asymptotic properties of the estimators of the model parameters and the nonparametric functions. The theoretical development can serve as a valuable template when dealing with estimating equations that involve systems of linear differential equations. We also investigate the performance of the proposed method using finite sample simulations and real data example.

Keywords Association · Archimedean copula · Dependent censoring · Identifiability · Martingale · Survival analysis

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