Asymptotic Theory for the Semiparametric Accelerated Failure Time Model with Missing Data

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Abstract: We consider a class of doubly weighted rank based estimating methods for the accelerated failure time model with missing data, for example case-cohort studies, where weights may not be predictable in a stochastic process formulation. We treat the general problem as a semiparametric estimating equation problem and provide proofs of asymptotic properties for the weighted estimators, with either true weights or estimated weights, by using the empirical process theory where the martingale theory may fail. Simulations show that the outcome-dependent weighted method works well for finite samples in case-cohort studies and improves efficiency comparing to the method using predictable weights, and that the method is even more efficient when estimated weights are used, which is commonly observed in the missing data literature.