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# Properties of estimators of baseline hazard functions in a semiparametric cure model

**Abstract** We consider a semiparametric cure model combining the Cox model with the logistic model. There are the two distinct methods for estimating the nonparametric baseline hazard function of the model; one is based on a pseudo partial likelihood and the other is to use an EM algorithm. In this paper, we discuss the consistency and the asymptotic normality of the estimators from the two methods. Then, we show that the estimator from the pseudo partial likelihood can be characterized by the (forward) Volterra integral equation, and the estimator from the EM algorithm by the Fredholm integral equation. These characterizations reveal differences in the properties between the estimators from the two methods. In addition, a simulation study is performed to numerically confirm the results in several finite samples.