

ASSESSING CUMULATIVE INCIDENCE
FUNCTIONS UNDER THE SEMIPARAMETRIC
ADDITIVE RISK MODEL

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Abstract

In analyzing competing risks data, a quantity of considerable interest is the cumulative incidence function. Often the effect of covariates on the cumulative incidence function is modeled via the proportional hazards model for the cause-specific hazard function. As the proportionality assumption may be too restrictive in practice, we consider an alternative more flexible semiparametric additive hazards model of McKeague and Sasieni for the cause-specific hazard. This model specifies the effect of covariates on the cause-specific hazard to be additive as well as allows the effect of some covariates to be fixed and that of others to be time-varying. We present an approach for constructing confidence intervals as well as confidence bands for the cause-specific cumulative incidence function of subjects with given values of the covariates. Furthermore, we also present an approach for constructing confidence intervals and confidence bands for comparing two cumulative incidence functions given values of the covariates. The finite sample property of the proposed estimators is investigated through simulations. We conclude our paper with an analysis of the well-known malignant melanoma data using our method.

Key words and phrases: Competing risks data; semiparametric additive hazards model; proportional hazards model; survival analysis.