PENALIZED LIKELIHOOD APPROACH IN A MIXTURE CURE MODEL

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We consider the problem of estimating non-parametrically the hazard function and the covariates effect in a mixture cure model. Cure models have been developed in survival analysis to take into account the possibility of cure. Mixture cure models assume that the studied population is a mixture of susceptible (uncured) subjects, that may undergo the event of interest while non-susceptible (cured) subjects will never undergo it. This model allows estimating simultaneously the covariate effect on the cure fraction and on the survival of uncured individuals. Various parametric and semi-parametric approaches have been proposed for the estimation of the survival function of uncured subjects. We propose to use a penalized likelihood approach that yields smooth estimate of the survival function for uncured individuals on all the observation period without parametric assumptions. The influence of covariates is modelized by a proportional hazard regression model. A logistic regression model is used to estimate the covariates effect on the cure fraction. Comparisons with other approaches are performed through simulations. The method can be applied to estimate the hazard function and the covariate effects for cancer data.