Model Selection for Correlated Survival Data

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The proportional hazards mixed-effects model (PHMM) has been proposed to handle Correlated survival data. It provides a general framework similar to the linear, non-linear and generalized linear mixed-effects models, which allows random effects of arbitrary covariates. Semiparametric maximum likelihood estimates of the model parameters and empirical Bayes estimates of the random effects can be obtained via an MCEM algoritm, and the asymptotic properties of the estimator have recently been established.

Model selection under the PHMM can be done via hypothesis testing or risk-based criteria. Both approaches face the dual challenges of dependence among the data and nuisance (baseline hazard) parameter. We develop likelihood ratio tests for the first approach, and Akaike information criteria for the second. For the Akaike information, we also consider the marginal and the conditional focus. The marginal focus is on the fixed effects and variance components parameters, while the conditional focus is on the fixed as well as the random effects. Time premitting we will discuss the computational aspects. The methods are illustrated using a multi-center clinical trial dataset in lung cancer.