Estimating survival from Gray's flexible model

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Flexible extension of the Cox proportional hazards (PH) model was introduced by Robert J. Gray in 1992[1]. This extension relies on the inclusion of penalized splines in the Cox PH model which allows for deviating from the assumption of proportionality via incorporating time-varying regression coefficients. In this context the piecewise-constant penalized splines were shown to exhibit more desirable estimation properties than their quadratic or cubic counterparts[1].

We illustrate the use of R function "gsurv.R" for estimating survival from Gray's piecewise-constant time-varying coefficients model[2] which is now part of the "coxspline" R package developed by Gray. The R package is available from the author's website (http://biowww.dfci.harvard.edu/~gray/) and is compatible with the 2.2.1 release of R. We show a few examples of estimating survival from the Gray's model in R using real and simulated data. Using a simulation study we assess the performance of survival estimators based on Cox PH, Aalen's linear and Gray's model under different modeling assumptions[3].

The work on this project was partially supported by the Institutional Research Plan AV0Z10300504.

References:

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[3] Valenta, Zdenek, Chang, Chung-Chou H. and Weissfeld, Lisa A. (2002). Model misspecification effect in univariable regression models for right-censored survival data. *ASA Proceedings of the Joint Statistical Meetings*, 3541-3546.