Title: Estimation of Parameters in the Semiparametric Proportional Mean Residual Life Model

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Abstract:

The mean residual life has captivated the interest of many researchers, both in theory and in practice, due to the immensity of its applications includidng that of industrial reliability studies of repair and replacement strategies, modeling life lengths of war and strikes in the social sciences, studying human populations in demography, setting rates and benefits for life insurance, optimal disposal of assets, renewal theory, dynamic programming, and branching processes, to name a few. It is defined as the remaining life expectancy of a subject given its survival up to time t. Tha is, $m(t) = E[T-t \mid T \geq t]$. As an alternative approach to the well known Cox proportional hazards model in characterizing the relationship of survival times with the individual subject's explanatory covariates, the proportional mean residual life model was introduced by Oakes and Dasu (1990) in the literature. In this paper, the relationship between these two models is investigated. General relationships between the hazard function and the mean residual life function are presented as well. In estimating the regression coefficients of the proportional mean residual life model, partial likelihood is exploited to procure a semiparametric approach which extracts the covariate effects from the Kaplan-Meier analogue of the empirical mean residual life. Results on the estimation procedure are illustrated by actual data.

Key words and phrases:

Proportional mean residual life model, proportional hazards model, life expectancy, hazard function, censoring, partial likelihood, semiparametric estimation