"Efficient Semi-parametric Estimation for Survival Data"

Catherine Huber[1],
Université Paris-Descartes , 45 rue des Saints-Pères, 75006 Paris,
and U780 INSERM, Villejuif, France
co-author : Filia Vonta [2]
Polytechnicum University in Athens, Greece , and
University of Cyprus P.O. Box 20537,
CY-1678, Nicosia, Cyprus,

Abstract:
We consider survival data that are both censored and truncated in the most general way. For example, the time of onset of a disease in a patient, like lung cancer or toxicity of a treatment, is not exactly known, but it is usually known to have taken place between two dates t_1 and t_2; this occurs in particular when the event of interest results in an irreversible change of state of the individual: at time t_1, the individual is in state one, while at time t_2, he is in state two, leading to interval censoring. Moreover, some people can escape the sample if they are observed during a period of time not including some pair of dates t_1, t_2 having the above property, leading thus to truncation. We assume a semi-parametric Cox model for the survival function and consider censoring and truncation distributions as in Huber, Solev and Vonta (2006). In Huber, Solev and Vonta (2007), we give conditions on the three involved distributions, namely, the censoring, truncation and survival distributions, implying the consistency of a nonparametric maximum likelihood estimator of the density of the survival process in the totally nonparametric case. We also provide the rate of convergence of the NPMLE of the density within a certain class of functions. Here, following Slud and Vonta (2005), we establish the form of the least favourable model for the cumulative hazard function, which is an infinite-dimensional nuisance parameter, for fixed values of the finite-dimensional parameter of interest. The estimation performed for the regression parameter under this least favourable nuisance parameter, has maximin properties for the full initial model. Though this least favourable model cannot be defined in closed form, assumptions and regularity conditions under which the assumptions posed in Slud and Vonta (2005) are fulfilled, and therefore the semi-parametric efficiency for the parameter of interest is derived, are currently being developed on the three involved distributions, the censoring, truncation and survival.

References

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[1] catherine.huber@parisdescartes.fr
[2] vonta@math.ntua.g

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