Two Competitors Among Semi-Markov Models for Multi-State Survival Data Analysis.

C. Huber[1]

The motivation for this paper is the analysis of a cohort where not only the survival time of patients, or time to failure of industrial items, but also their level of degradation, classified into a finite number of states, is under study. The process is assumed to be semi-Markov in order to weaken the usual Markov assumption which is often too restrictive. The behavior of such a process is defined through the initial probabilities on the set of possible states, the direct transition probabilities between any two states and the sojourn times distributions in any state as functions of the actual state and the one reached from there at the end of the sojourn. Two models are considered: on one side the most usual model in this framework which is the independent competing risk (ICR) model and a general semi-Markov model (GSM) embedding (ICR). Based on an estimation of the direct transition probabilities in the general semi-Markov model (GSM) embedding (ICR), we derive a goodness of fit test for the Independent Competing Risks model. Simulations show that the proposed test works well.

Keywords: Censoring, Competing risks, Goodness of fit, Quality of Life, Semi-Markov, Transition functions,

References:

Bagdonavicius, V. and Nikulin, M.S.(2002). Accelerated Life Models. Chapman & Hall CRC.

Heutte, N., Huber C., Pons, O. Inference for a General Semi-Markov Model as an Alternative to the Competing Risks. (2002), Technical report, University Paris 5.

Therneau, T.M., Grambsh P.M. (2000). Modeling Survival Data. Extending the Cox Model. New York, Springer.

[1] UFR Biomédicale, Université de Paris V,45, rue des Saints-Pères, 75 270 Paris Cedex 06, FRANCE, IFR 69 and Unité INSERM 472, 16 av. P-V Couturier, 94 807 Villejuif, huber@biomedicale.univ-paris5.fr