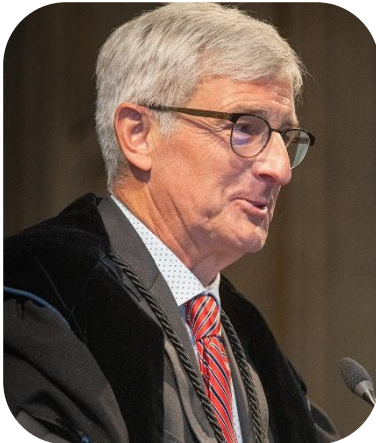


S E M I N A R



Prof Jan Beirlant
(KU Leuven, Belgium)

Date:

Friday, 28 February 2025

Time:

13h10-14h10 SAST

Venues:

- Room 2048, 2nd floor
Van der Sterr Building,
cnr Victoria & Bosman Streets
Stellenbosch
- Online

WHO SHOULD ATTEND?

All are welcome.

ENQUIRIES:

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Non-parametric cure models through tail estimation

ABSTRACT:

In survival analysis, the estimation of the proportion of subjects who will never experience the event of interest, termed the cure rate, has received considerable attention recently. Its estimation can be a particularly difficult task when follow-up is not sufficient, that is when the censoring mechanism has a smaller support than the distribution of the target data. In the latter case, non-parametric estimators were recently proposed using extreme value methodology, assuming that the distribution of the susceptible population is in the Fréchet or Gumbel max-domains of attraction.

In this paper, we take the extreme value techniques one step further, to jointly estimate the cure rate and the extreme value index, using probability plotting methodology, and in particular using the full information contained in the top order statistics. In other words, under sufficient or insufficient follow-up, we reconstruct the immune proportion. To this end, a Peaks-over-Threshold approach is proposed under the Gumbel max-domain assumption. Next, the approach is also transferred to more specific models such as Pareto, log-normal and Weibull tail models, allowing to recognise the most important tail characteristics of the susceptible population. Our estimators are shown to perform well against state-of-the-art models, even when purely considering cure rate estimation.

This work is in collaboration with M. Bladt (Copenhagen) and I. Van Keilegom (Leuven).

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