Peaks over random threshold best linear unbiased estimation of the extreme value index

M. Ivette Gomes[1] **and Lígia Henriques-Rodrigues**[2]

[1] *University of Lisbon, Portugal*
[2] *Polytechnic Institute of Tomar, Portugal*

Abstract

In the general theory of *Statistics*, whenever we ask the question whether the combination of information can improve the performance of an estimator, we are led to think on *Best Linear Unbiased Estimators* (BLUE), i.e., on unbiased linear combinations of an adequate set of statistics, with minimum variance among the class of such linear combinations. In *Statistics of Extremes* and regarding the estimation of the *Extreme Value Index* (EVI), the primary parameter in this area, such an approach has been considered in Gomes *et al.* (2004), where asymptotically unbiased BLUE have been studied. But these estimators, like the classical Hill estimators (Hill, 1975) are not location-invariant, contrarily to the PORT-Hill estimators, recently introduced in Araújo Santos *et al.* (2006) and further studied for finite samples in Gomes *et al.* (2008), where PORT stands for *Peaks Over Random Threshold*. In this paper we shall consider PORT-BLUE, providing an adaptive choice of the *tuning parameters* under play and an application to environmental data.

Keywords

Statistics of extremes, Semi-parametric estimation, Best linear unbiased estimators, Peaks over random threshold methodology.

References

Araújo Santos, P., Fraga Alves, M.I., and Gomes, M.I. (2006). Peaks over random threshold methodology for tail index and quantile estimation. *REVSTAT 4(3)*, 227–247.

Gomes, M.I., Figueiredo, F., and Mendonça, S. (2004). Asymptotically best linear unbiased tail estimators under a second order regular variation. *J. Statist. Plann. Inference 134(2)*, 409–433.

Gomes, M.I., Fraga Alves, M.I., and Araújo Santos, P. (2008). PORT Hill and moment estimators for heavy-tailed models. *Comm. Statist. Simulation Comput. 37(6)*, 1281–1306.

Hill, B. (1975). A simple general approach to inference about the tail of a distribution. *Ann. Statist. 3*, 1163–1174.