A Review and Recent Developments in Tail Inference

F. Caeiro[a]

[a] *Center for Mathematics and Applications (CMA), NOVA University Lisbon, Portugal*

1 Abstract

Studying Extreme events can be a challenge, because these rare events can occur outside the range of available data. Consequently, statistical inference is derived from extreme observations, using an appropriate tail model. In practice, the sample size is small. The extreme-value index (EVI) measures the weight of the tail and is one of the primary parameters of extreme events. Thus, a crucial step in tail inference is the estimation of the EVI. If $\xi < 0$, the distribution function F belongs to the max-domain of attraction of the Weibull distribution, then is short-tailed i.e. F has an upper bounded support; if $\xi = 0$, F belongs to the max-domain of attraction of the Gumbel distribution and $1 - F$ has an exponential decay; If $\xi > 0$, F is heavy-tailed, i.e., F belongs max-domain of attraction of the Fréchet distribution. Consequently, $1 - F$ has a polynomial decay. Attention will be given to heavy-tailed models, which are extremely important due to the low frequency and high magnitude of extreme values.