On the asymptotic behavior of the proportions of near-maxima

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Abstract

A near-maximum claim size is one falling within a fixed distance $a$ of the current record claim size (see e.g. [2]). It is known (see e.g. [3]) that the proportions of near maxima of i.i.d. random variables with common continuous distribution function $F$ such that $r_F := \inf\{t \in \mathbb{R} : F(x) = 1\} < \infty$ is a strongly consistent estimator of the tail probability $1 - F(r_F - a)$.

Our aim is to prove the large deviation principle (see e.g. [1]) for the proportions of near maxima. The rate function can be expressed with a variational expression in terms of the relative entropy (or Kullback Leibler divergence) of a Bernoulli distribution with respect to another one.

Key words:
Near-maximum insurance claim; large deviations; relative entropy.

References

