

A bias-reduced estimator for the mean of a heavy-tailed distribution with an infinite second moment

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Abstract

We use bias-reduced estimators of high quantiles of heavy-tailed distributions, to introduce a new estimator for the mean in the case of infinite second moment. The asymptotic normality of the proposed estimator is established and checked in a simulation study, by four of the most popular goodness-of-fit tests. The accuracy of the resulting confidence intervals is evaluated as well. We also investigate the finite sample behavior and compare our estimator with some versions of Peng's estimator of the mean (namely those based on Hill, t-Hill and Huisman et al. extreme value index estimators). Moreover, we discuss the robustness of the tail index estimators used in this paper. Finally, our estimation procedure is applied to the well-known Danish fire insurance claims data set, to provide confidence bounds for the means of weekly and monthly maximum losses over a period of 10 years.

Keywords : Bias reduction; Extreme values; Heavy-tailed distributions; Hill estimator; t-Hill estimator; Mean; Peng estimator; Regular variation; Tail index

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