

Regression-type analysis for black swan events

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Block maxima data—such as annual maxima—are a mainstay of Statistics of Extremes. Whereas classical statistical modeling is mostly concerned with inferences surrounding the bulk of a distribution, the field of Statistics of Extremes deals with the rather challenging situation of conducting inferences about the tail of a distribution. The behavior of extreme values in large samples is often mathematically tractable, and this tractability is often used to build sound statistical methods for modeling risk and extreme values.

In this talk, I will devise a regression-type model for the situation where both the response and covariates consist of extreme events. The proposed approach is designed for the setting where both the response and covariates are themselves block maxima, and thus contrarily to standard regression methods it takes into account the key fact that the limiting distribution of suitably standardized componentwise maxima is an extreme value copula. An important target in the proposed framework is the *regression manifold*, which consists of a family of regression lines obeying the latter asymptotic result. To learn about the proposed model from data, we employ a *Bernstein polynomial prior* on the space of angular densities which leads to an induced prior on the space of regression manifolds. Numerical studies suggest a good performance of the proposed methods, and a finance real-data illustration reveals interesting aspects on the comovements of extreme losses between two leading stock markets. Joint work with G. dos Reis and A. Kumukova.

References

- [1] DE CARVALHO, M., DOS REIS, G. & KUMUKOVA, A. *Regression-type analysis for block maxima on block maxima*, arXiv:2102.09497 (2021).