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Title: High-dimensional peaks-over-threshold inference

Abstract: Max-stable processes are increasingly widely used for modelling complex extreme events, but existing fitting methods are computationally demanding, limiting applications to a few dozen variables. r-Pareto processes are mathematically simpler and have the potential advantage of incorporating all relevant extreme events, by generalizing the notion of a univariate exceedance. In this paper we investigate score matching for performing high-dimensional peaks over threshold inference, focusing on extreme value processes associated to log-Gaussian random functions and discuss the behaviour of the proposed estimators for regularly-varying distributions with normalized marginals. Their performance is assessed on grids with several hundred locations, simulating from both the true model and from its domain of attraction. We illustrate the potential and flexibility of our methods by modelling extreme rainfall on a grid with 3600 locations, based on risks for exceedances over local quantiles and for large spatially accumulated rainfall, and briefly discuss diagnostics of model fit. The differences between the two fitted models highlight the importance of the choice of risk and its impact on the dependence structure. The work is joint with Raphaël de Fondeville.