Karlsruher Institut für Technologie

Institut für Stochastik

Einladung zu einem Vortrag in der

AG STOCHASTIK

am Dienstag, 16.12.2025, um 15.45 Uhr.

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spricht über das Thema

Dimension Reduction of High-Dimensional Extremes

In multivariate extreme value analysis, inference typically relies only on the most extreme observations, often resulting in a high-dimensional setting. Under regular variation, dependence is encoded by the spectral vector, whose support typically lies in a low-dimensional subspace; a structure we exploit for dimension reduction. To address this, two approaches are proposed, covering both fixed and high-dimensional settings. First, building upon sparse regular variation, we derive a Bayesian information criterion (BIC), a mean-squared error-based information criterion (MSEIC), and a quasi-Akaike information criterion (QAIC) and analyze the Akaike information criterion (AIC) of Meyer & Wintenberger (2024), where only BIC and QAIC are consistent in fixed dimensions. In high dimensions, all criteria are consistent. Second, we apply principal component analysis to the spectral vector, selecting the number of principal components using AIC and BIC. In fixed dimensions, BIC is consistent but AIC is not; in high dimensions, both are consistent. Finally, we evaluate both approaches via simulations and apply them to real-world datasets.

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Die Dozentinnen und Dozenten der Stochastik