

Shape Constraints and Multiscale Methods for Density Estimation

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Abstract

In nonparametric curve estimation, shape constraints such as monotonicity or convexity are known to yield estimators adapting to unknown smoothness properties of the underlying curve. This talk discusses a particular shape constraint in the context of density estimation. We assume that the underlying density is log-concave and show that the resulting nonparametric estimators of the density and distribution function have various interesting properties.

While log-concavity is a reasonable assumption in connection with homogeneous populations, another task in density estimation is inference about modality and local log-concavity or -convexity. We present some multiscale procedures for these purposes yielding confidence statements with guaranteed level for finite samples.

This is joint work with Kaspar Rufibach (Bern) and Guenther Walther (Stanford).