



Theoretical properties of bandwidth selectors for kernel density estimation on the circle

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Abstract

We derive the asymptotic properties of the least squares cross-validation (LSCV) selector and the direct plug-in rule (DPI) selector in the kernel density estimation for circular data. The DPI selector has a convergence rate of $O(n^{-5/14})$, although the rate of the LSCV selector is $O(n^{-1/10})$. Our simulation shows that the DPI selector has more stability than the LSCV selector for small and large sample sizes. In other words, the DPI selector outperforms the LSCV selector in theoretical and practical performance.

Keywords Kernel density estimation · Circular data · Smoothing parameter selector · Least squares cross-validation · Direct plug-in rule

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