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Fast and accurate computation for kernel estimators

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Abstract: Standard kernel density and regression estimators are well-known to be computationally very slow when analyzing large data sets, and algorithms that achieve considerable computational savings are highly desirable. With this goal in mind, two fast and accurate computational methods are proposed in this paper for computation of univariate and multivariate local polynomial estimators defined on **an equally spaced grid**. Compared to direct implementation, the proposed algorithms lead to substantial computational savings. For the case in which the evaluation points are not the grid points, a fast algorithm is also proposed. It is shown that the proposed method is asymptotically superior to the general binning method. Numerical comparisons are also made to compare computational speeds and error bounds of the proposed methods with those of the linear binning and the direct implementation.

Keywords: Fast computation, density estimation, local polynomial regression, binning algorithm.

Abbreviated title: Fast and accurate computation

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