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**Visualization and bandwidth matrix choice.** (English) Zbl 1238.62042  
*Commun. Stat., Theory Methods* 41, No. 4-6, 759-777 (2012).

Summary: Kernel smoothers are among the most popular nonparametric functional estimates. These estimates depend on a bandwidth that controls the smoothness of the estimate. While the literature for bandwidth choice in a univariate density estimate is quite extensive, the progress in the multivariate case is slower. The authors focus on a bandwidth matrix selection for a bivariate kernel density estimate provided that the bandwidth matrix is diagonal. A common task is to find entries of the bandwidth matrix which minimize the Mean Integrated Square Error (MISE). It is known that in this case there exists explicit solutions for asymptotic approximation of the MISE [*M.P. Wand and M.C. Jones, Kernel smoothing*. London: Chapman and Hall (1995; [Zbl 0854.62043](#))]. In this paper we pay attention to the visualization and optimizers are presented as intersections of bivariate functional surfaces derived from these explicit solutions, and we develop the method based on the visualization. A simulation study compares the least squares cross-validation method and the proposed method. Theoretical results are applied to real data.

**MSC:**

[62G07](#) Density estimation  
[62H12](#) Estimation in multivariate analysis  
[62A09](#) Graphical methods in statistics  
[65C60](#) Computational problems in statistics (MSC2010)

Cited in 1 Document

**Keywords:**

asymptotic mean integrated square error; product kernel

**Full Text:** [DOI](#)

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