Abstract

We propose a class of nonparametric estimators for regression models based on least squares over sufficiently smooth sets of functions. These estimators permit the imposition of restrictions on additional monotonicity and concavity constraints.

Estimation takes place over balls of functions which are elements of suitable Sobolev spaces. The Sobolev spaces are special types of Hilbert spaces with a certain inner product, which is induced by a positive-definite bilinear form or projection. The Hilbert space is allowing us to take projections and hence to compose operations in an abstract functional-analytical environment. We essentially prove necessary and sufficient conditions for statistical estimation in these spaces. Thus we transform the problem of searching for the best fitting function in an infinite-dimensional space into a finite-dimensional optimization problem.

In regression in Sobolev spaces, we have demanded only measurable

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