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Exact asymptotics of the optimal L_p -error of asymmetric linear spline approximation[†]

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Abstract

In this paper we study the best asymmetric (sometimes also called penalized or sign-sensitive) approximation in the metrics of the space L_p , $1 \leq p \leq \infty$, of functions $f \in C^2([0, 1]^2)$ with nonnegative Hessian by piecewise linear splines $s \in S(\Delta_N)$, generated by given triangulations Δ_N with N elements. We find the exact asymptotic behavior of the optimal (over triangulations Δ_N and splines $s \in S(\Delta_N)$) error of such an approximation as $N \rightarrow \infty$.

Keywords: spline, asymmetric approximation, adaptive approximation, exact asymptotics, optimal error, anisotropic partitions, triangulations.

MSC: Primary 41A15; Secondary 41A25, 41A60.

§1. Introduction

The problem of approximation of functions defined on a polytope by piecewise polynomial functions (splines), generated with the help of a mesh (partition of the domain) in various metrics is of great importance in Approximation Theory and its applications

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