Sukhorukova, Nadezda; Ugon, Julien

A generalisation of de la Vallée-Poussin procedure to multivariate approximations. (English)


Summary: The theory of Chebyshev approximation has been extensively studied. In most cases, the optimality conditions are based on the notion of alternance or alternating sequence (that is, maximal deviation points with alternating deviation signs). There are a number of approximation methods for polynomial and polynomial spline approximation. Some of them are based on the classical de la Vallée-Poussin procedure. In this paper we demonstrate that under certain assumptions the classical de la Vallée-Poussin procedure, developed for univariate polynomial approximation, can be extended to the case of multivariate approximation. There are two main advantages of our approach. First of all, it provides an elegant geometrical interpretation of the procedure. Second, the corresponding basis functions are not restricted to be monomials and therefore can be extended to a larger family of functions.

MSC:
41A63 Multidimensional problems
41A10 Approximation by polynomials

Keywords:
multivariate polynomial; Chebyshev approximation; de la Vallée-Poussin procedure; Radon theorem

Full Text: DOI

References:

Edited by FIZ Karlsruhe, the European Mathematical Society and the Heidelberg Academy of Sciences and Humanities
© 2022 FIZ Karlsruhe GmbH